

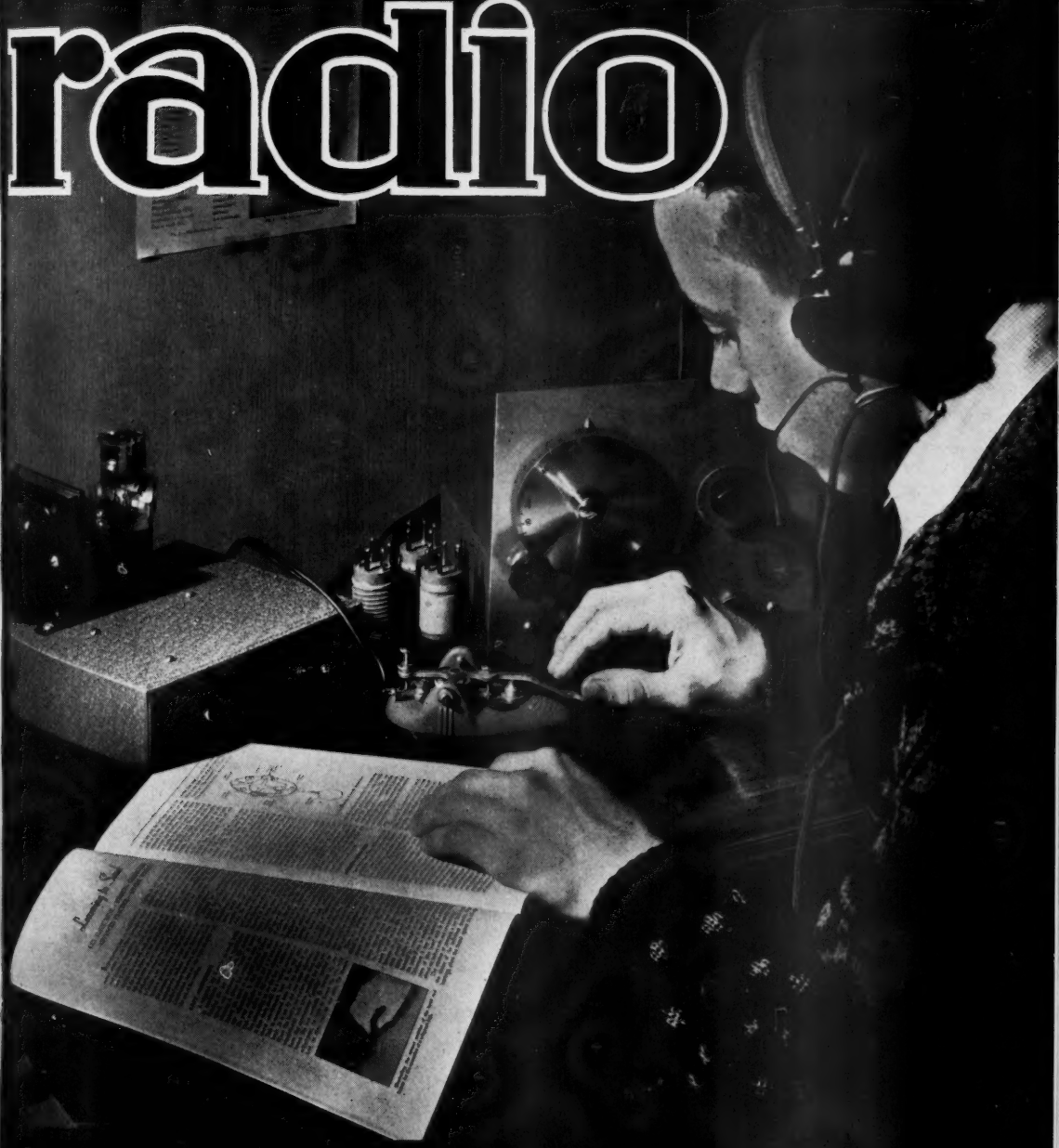
# QST

December, 1947

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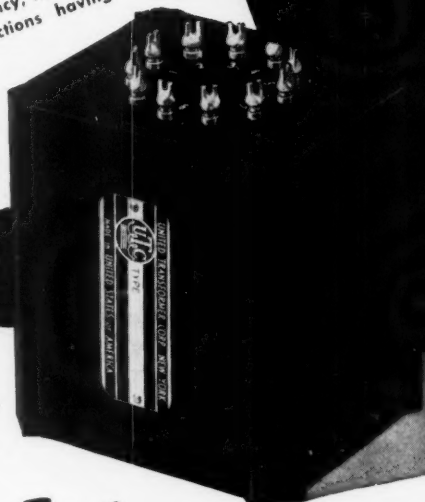
# amateur radio



# LS SERIES

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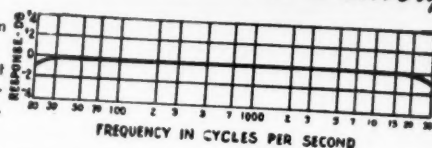
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LS-10X	As above	As above	50,000 ohms	+14 DB	-92 DB-Q	5 MA	\$32.00
LS-21	Single plate to push pull grids	8,000 to 15,000 ohms	135,000 ohms; turn ratio 3:1 overall	+14 DB	-74 DB	0 MA	\$24.00
LS-30	Mixing, low impedance mike, pickup, or multiple line to multiple line	50, 125, 200, 250, 333, 500/600 ohms	50, 125, 200, 250 333, 500/600 ohms	+17 DB	-74 DB	5 MA	\$25.00
LS-30X	As above	As above	As above	+15 DB	-92 DB-Q	3 MA	\$32.00
LS-50	Single plate to multiple line	8,000 to 15,000 ohms	50, 125, 200, 250, 333, 500/600 ohms	+17 DB	-74 DB	0 MA	\$24.00
LS-55	Push pull 2A3's, 6ASG's, 300A's, 275A's, 6A3's, 6L6's	5,000 ohms plate to plate and 3,000 ohms plate to plate	500, 333, 250, 200, 125, 50, 30, 20, 15, 10, 7.5, 5, 2.5, 1.2	20 watts			\$28.00
LS-57	Same as above	5,000 ohms plate to plate and 3,000 ohms plate to plate	30, 20, 15, 10, 7.5, 5, 2.5, 1.2	20 watts			\$20.00

The above listing includes only a few of the many units of the LS Series. For complete listing — write for catalogue.

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# QST

DECEMBER 1947

VOLUME XXXI • NUMBER 12

PUBLISHED, MONTHLY, AS ITS OFFICIAL ORGAN, BY THE AMERICAN RADIO RELAY LEAGUE, INC., AT WEST HARTFORD, CONN., U. S. A.; OFFICIAL ORGAN OF THE INTERNATIONAL AMATEUR RADIO UNION

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Subscription rate in United States and Possessions, \$3.00 per year, postpaid; \$3.50 in the Dominion of Canada, \$4.00 in all other countries. Single copies, 35 cents. Foreign remittances should be by international postal or express money order or bank draft negotiable in the U. S. and for an equivalent amount in U. S. funds.

Entered as second-class matter May 19, 1919, at the post office at Hartford, Connecticut, under the Act of March 3, 1879. Acceptance for mailing at special rate of postage provided for in section 1103, Act of October 3, 1917, authorized September 9, 1922. Additional entry at Concord, N. H., authorized February 21, 1929, under the Act of February 28, 1925.

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## — CONTENTS —

"It Seems to Us . . ."	11
Sunspots and Very-High-Frequency Radio Transmission Kenneth A. Norton	13
The "Q5-er" . . . . . Philip S. Rand, W1DBM	18
Let's Start Right on 1 $\frac{1}{4}$ ! . . Calvin F. Hadlock, W1CTW	22
Technical Topics	
21 Mc. — An Appraisal . . . . .	26
How High Is an Inversion? . . . . .	27
Building a Code-Practice Receiver Richard M. Smith, W1FTX	28
A 40-Pound 14-Mc. Four-Element Beam Katashi Nose, KH6IJ, ex-K6CGK	35
Silent Keys . . . . .	38
Happenings of the Month. . . . .	39
Winds, Waves and Snakes Albert Hayes, W1IIN, ex-W3LVY	40
I.A.R.U. News . . . . .	45
Keying the Tetrode Amplifier . Byron O. Ballou, W6BET	46
Important Message to All VE Amateurs . . . . .	47
Hints and Kinks . . . . .	48
Our Cover . . . . .	49
Hamfest Calendar . . . . .	49
United States Naval Reserve . . . . .	50
How's DX? . . . . .	51
A Universal Transmission Bridge John M. Tiffany, ex-W3CQN, ex-W2GGK	54
Paradise Regained . . . . . Byron Goodman, W1DX	56
'Phone-Band Phunnies . . . . . John T. Frye, W9EGV	57
In QST 25 Years Ago This Month . . . . .	57
The World Above 50 Mc. . . . .	58
Correspondence from Members . . . . .	62
Operating News . . . . .	63
Station Activities . . . . .	70
ARRL QSL Bureau . . . . .	140
WWV Schedules . . . . .	142
QST Index for 1947 . . . . .	157



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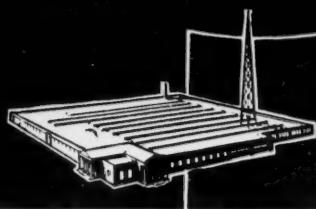
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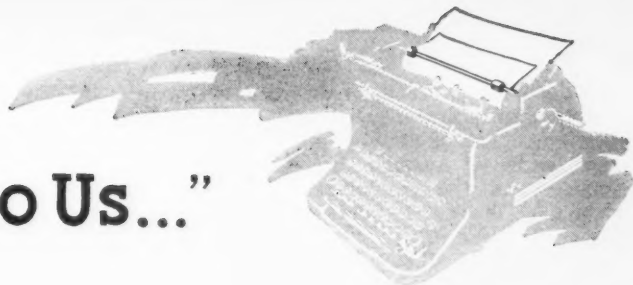
**Reports Invited.** All amateurs, especially League members, are invited to report station activities on the first of each month (for preceding month) direct to the SCM, the administrative ARRL official elected by members in each Section. Radio Club reports are also desired by SCMs for inclusion in *QST*. **All ARRL Field Organization appointments** are now available to League members. These include ORS, OES, OPS, OO, and OBS. Also, where vacancies exist SCMs desire applications for SEC, EC, RM, and PAM. In addition to station and leadership appointments for Members, *all amateurs* are invited to join the ARRL Emergency Corps (ask for Form 7).

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## "It Seems to Us..."



### WANTED: A SECOND SPECTRUM

The radio world most desperately needs more spectrum space. If some solution is not found soon, working conditions will become intolerable for every radio service. With constant growth both in the number of stations and in the number of specialized new services, the physical provisions of the useful spectrum are pitifully inadequate for the world's requirements. All persons associated with frequency-allocation work in this country, particularly during the recent years of postwar planning culminating in the Atlantic City conferences, have known how intensely difficult it is to make adequate provision for national needs, even within the framework of a single national pattern of life. When the divergent ideas of seventy-nine nations were laid in parallel at Atlantic City it was small wonder that it took nearly five months to come to agreement. And that agreement, although a mammoth accomplishment in view of the difficulties, is in truth simply an aggregation of compromises and exceptions, a group of negotiated decisions that fail to meet adequately the needs and wishes of any country or any service. This unsatisfactory condition flows from one simple fact: the frequency spectrum isn't big enough. If there were ample space, a world conference would get through its allocation work in a single day. As it is, they are endurance contests, and the worst is yet to come.

The primary trouble derives, of course, from the demands of high-frequency broadcasting. If there were no need to make provisions for this alleged service, the spectrum would be just about sufficient, we think, to take care of the bona fide requirements of the communication services today; but as it is, the poor old spectrum just doesn't have enough stretch in it to do the job. It does no good to say that international broadcasting is futile or that the safety and communication services can spare no more frequencies. The broadcasting administrations of foreign countries, particularly in Europe and Asia, are determined to have more and more spectrum

space, and in such countries they commonly outrank the government agencies dealing with communications. The net result is that the full voice and power of sovereign states are more and more being aligned in a common demand for greatly-widened broadcasting allocations, regardless of the injury to other services. And the international conferences are made up of sovereign nations, so that the votes of their authorized delegates decide what is done. If that's what the majority of the nations really want, there is no visible way to stop them. At Atlantic City the governments with large commercial interests were extended to their utmost to prevent the destruction of the fixed, maritime and amateur services. At that, contrary to the wishes of the United States and Canada, h.f. broadcasting gained quite a few hundred kilocycles in the most valuable parts of the spectrum, at the expense of other services. It is difficult to portray adequately the greed, rapacity and general radio-dumbness of the average foreign spokesman for government broadcasting. With exceptions, of course, he is commonly a rather high-powered political character, not a real radio man and not a technical man, caring less than nothing for the communication services and rioting in the plenipotentiary powers given him by his government. Radio means only broadcasting to him and he doesn't care what happens to other services as long as he gets what he wants. Yet all too frequently he possesses the final say for his government in frequency matters, even disregarding the communication needs of other agencies of his own government and succeeding in committing his country to an extravagant position. In short, by the time the votes are counted most foreign countries are absolutely hipped on international broadcasting.

H.f. broadcasting, then, is the particular curse of an international radio conference. It has been reliably calculated by engineers that it would take about half of the h.f. spectrum to set up, on sound technical principles, an idealized system meeting every nation's ambition of being able to propagandize every other nation. It has been estimated by us that

it would take a fat three-quarters of the spectrum to give these guys what they want. The hell of it is that they are growing in power and influence, not losing, so that it is only a question of time until they will have their way unless something is done about it. Livid at Cairo, livider at Atlantic City despite their immense gains, the representatives of foreign government broadcasting still feel that they got the short end of things there and are impatiently determined to use the power of their governments to get what they want next time. If the communication services do not watch out, some fine day the broadcasters will possess the spectrum, and the art born of Marconi and Popoff and nurtured by generations of communicators everywhere will disappear from the earth and turn over its frequencies to syrupy voices selling coffee, purgatives and national ideologies.

But that is only part of the story — there is more to it than broadcasting. Something similar is happening within some of the other services. Take the maritime mobile service as an instance. In that service there is a clash between radiotelephony and radiotelegraphy. There are those who hold that the important coming service is ship-to-shore voice communication, tied in to the land networks, so that passengers may talk direct by voice with correspondents on shore. At Atlantic City a goodly chunk of each maritime band was suballocated for this purpose. Again the pressure was so great that it didn't matter too much whether this was done at the expense of safety of life at sea or of record communication.

By this time a pattern is discernible and the alert reader will see that this trend is something with which we are already familiar in amateur ranks. It is only another aspect of our own old argument about how the ham bands should be allocated between 'phone and c.w. Now transmuted to world dimensions, the fundamental quarrel is between voice and record communication, and the pinch simply comes from the fact that the frequency requirements for voice communication are enormously greater than they are for telegraphy and that an overstretched spectrum can't yield any more. The danger is that in a world where power and money are determining, the older and more sedate services are likely to be exterminated eventually if some relief at the technical level is not found.

This problem — of finding more frequencies for more stations — has been growing for at least twenty years. The attempted solution, up to date, has been to pack the stations in closer, by increasing the stability of transmitters and the selectivity of receivers. In other words, to "slice it thinner" by decreasing

channel-widths. Another solution was suggested by the appeal this past spring of the chairman of the Federal Communications Commission to the convention of the Institute of Radio Engineers to find a means of taming the microwaves so that they would cover transoceanic distances. In other words, to extend the useful spectrum. You may have suspected that we want to propose still a third mode of attack. You'd be quite right: We propose that the technical means be found to split the spectrum lengthwise into two parts, each to be assigned to a different mode of operation that would offer no interference to the other, one for voice communication and one for telegraphy.

We think that in that last sentence above we have expressed almost the whole of the problem confronting modern communications. We ask you to contemplate what a solution would do for a beleaguered radio world. Take those maritime-mobile bands again for an example. The ideas of the proponents of ship-shore telephony could grow until they embraced the full width of the bands and nobody would care, because the whole of the bands would still be available to telegraphy. More fundamentally, the encroachments of broadcasting on the fixed service would be ended forever. All of those vast reaches of the spectrum necessary to carry on the world's fixed service could be made available to h.f. broadcasting, in widths beyond the dreams of even that particular kind of avarice, yet nobody would care, because all of those frequencies would still be fully available for the record communications so essential to world commerce and national well-being. An example closer home will perhaps be even more convincing: If such a system existed, the entire widths of amateur bands could be available for 'phone operation and no c.w. amateur would care, since the same full bandwidths would be available to him for telegraphy and there would be no mutual interference. Moreover, by that time there would be so much surplus space in the spectrum, through the possibility of overlapping the services, that there'd be room for more and wider amateur bands.

It is our belief that we, editorially speaking, survived the strain of Atlantic City in fairly good fashion, and we offer assurances that we have not since taken up opium. It seems to us to be technically reasonable to hope for the development of two modes of communication, one for voice and one for telegraphy, that would offer no mutual QRM and that would yield the practical equivalent of two complete r.f. spectrums. We furthermore suggest that this is a job that somehow must be accom-

(Continued on page 108)

# Sunspots and Very-High-Frequency Radio Transmission

BY KENNETH A. NORTON \*

At the present time (1947) the activity of sunspots as measured by the Zurich sunspot numbers <sup>1</sup> is at a higher level than it has ever reached since the discovery of radio during the latter part of the 19th century. In view of our knowledge of the close correlation between the sunspot activity and the characteristics of high-frequency radio transmission via the ionosphere, we may expect very unusual radio propagation conditions generally in the next few months, and, in particular, the ionosphere may be expected to support radio transmission on higher frequencies than ever before.

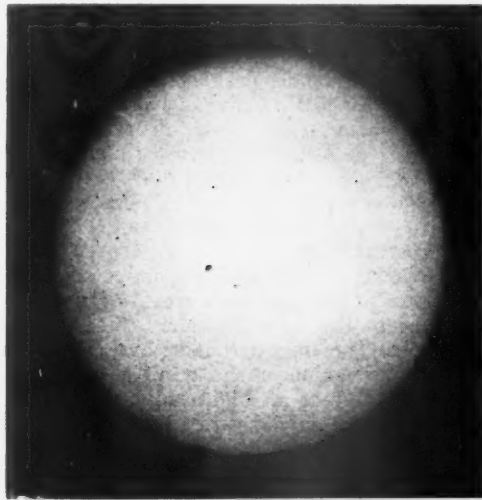
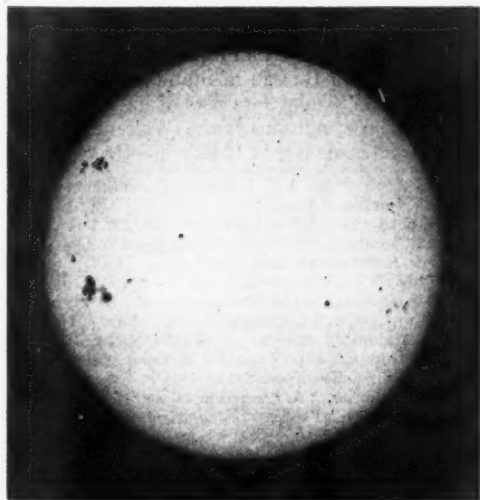
These spots on the sun are often so large that they can be seen without the aid of telescopes simply by viewing the sun through a smoked glass, or, better yet, by using a pinhole to obtain an image of the sun on a white background. Of course, even better results can be obtained by using a telescope to obtain an image on a white background and even an inexpensive telescope such as is available in many toy shops may be used for this purpose. In this connection it is important to emphasize that the telescope must

• The effects of the present (1947) high sunspot activity on the maximum radio frequencies usable for radio transmission via the ionosphere are discussed. A brief description is given of past and present sunspot activity and the predictions of future activity made by several research workers are compared with each other and with the actual sunspot activity observed during the early part of the present cycle. It is pointed out that the 50-54 Mc. amateur frequency band will probably be useful for the first time this winter for  $F_2$  layer ionospheric transmission across the United States on east-west paths. A statistical study of the Washington, D. C. noon maximum usable frequencies is included.

not be used to view the sun directly because of probable damage to the eyes of the observer; unless the projection method is used it will be necessary to use a *specially* designed filter for direct viewing. The two photographs of the sun shown were made at the Naval Observatory in Washington, D. C. The left-hand photograph was made on March 6, 1947, and is characterized by several large groups of sunspots; the right-hand

\* Central Radio Propagation Laboratory, National Bureau of Standards, Washington 25, D. C.

<sup>1</sup> W. Brunner, "Tables on Sunspot-Frequency for 1749-1938," *Terrestrial Magnetism and Atmospheric Electricity*, September 1939, pp. 247-256; these Zurich sunspot numbers are published for later years in subsequent issues of the above journal.



Photographs of the sun made at the Naval Observatory, Washington, D. C.

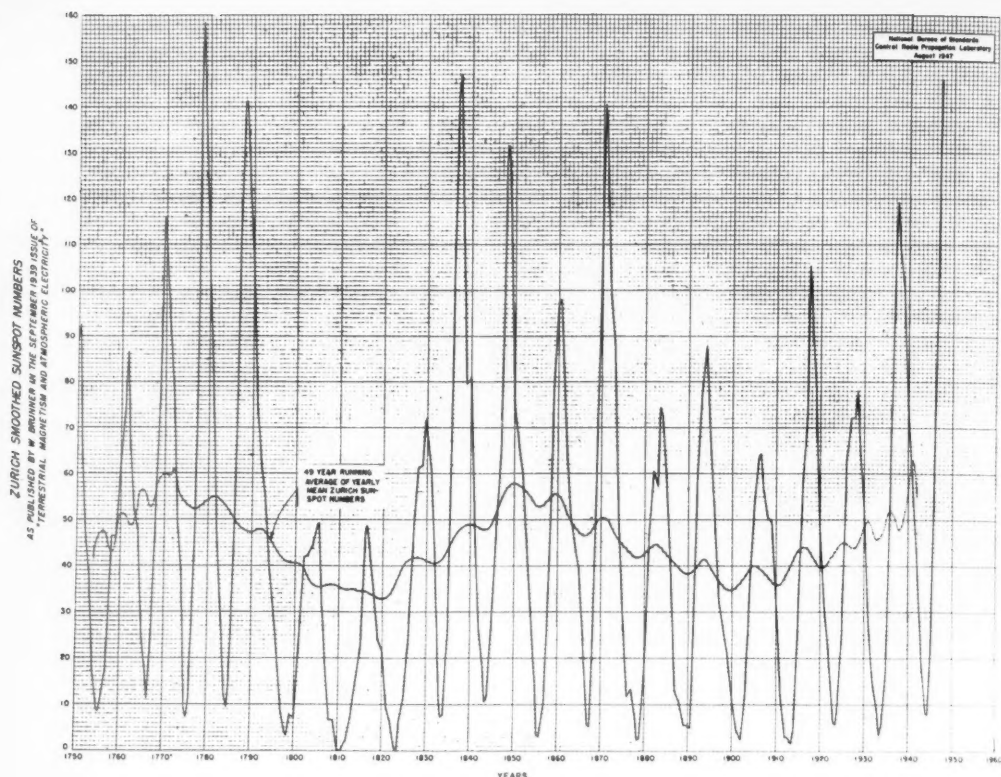


Fig. 1 — Secular variations exhibited by past sunspot cycles.

photograph was taken 14 days later on March 20, 1947, and thus approximately represents the side of the sun opposite to that in the left-hand photograph since the period of rotation of the sun is about 27 days. It will be noted that the visible portion of the sun was much less active on the latter date. The Zurich sunspot number is based upon observations at the Zurich Observatory in Switzerland and is obtained by the formula  $S = k(10g + n)$  where  $g$  denotes the number of groups of spots,  $n$  the total number of spots, and  $k$  is a constant characteristic of the observer and his telescope. The Zurich daily sunspot numbers for these two days were reported by the Zurich Observatory to be 198 and 57, respectively, while the average number for the month of March 1947 was 129.8.

The great variability of the sunspot activity from year to year and from cycle to cycle is illustrated in Fig. 1, which shows these secular variations. The 49-year running average of the annual sunspot numbers shown in Fig. 1 indicates that there may be an additional cyclical variation of sunspot activity with a period greatly in excess of the well-defined variation exhibited by the smoothed sunspot numbers and characterized by an average period of about 11 years. Fig. 2 shows the most recent variations in the monthly

mean and the smoothed sunspot numbers; the smoothed sunspot numbers are moving averages for 12 successive months and are shown by the solid line. Also shown in Fig. 2 are several values of the smoothed sunspot number as predicted for the period near the coming maximum of sunspot activity; the McNish and Lincoln<sup>2</sup> predictions were made by the statistical method in current use at the Central Radio Propagation Laboratory of the National Bureau of Standards in connection with the regular forecasts of high-frequency transmission conditions<sup>3</sup>; the Waldmeier<sup>4</sup> prediction was made late in 1945, while the Stewart<sup>5</sup>

<sup>2</sup> A. G. McNish and J. V. Lincoln, "Prediction of Annual Sunspot Numbers," Report No. CRPL-1-1, May 15, 1947, published by the Central Radio Propagation Laboratory, National Bureau of Standards, Washington, D. C.

<sup>3</sup> *Basic Radio Propagation Predictions*, CRPL Series D, a monthly publication giving ionospheric propagation conditions three months in advance as predicted by the Central Radio Propagation Laboratory, National Bureau of Standards; this monthly publication may be obtained by subscription from the Superintendent of Documents, Government Printing Office, Washington, D. C.

<sup>4</sup> M. Waldmeier, "A Prediction of the Next Maximum of Solar Activity," *Terrestrial Magnetism*, 51, 270, 1947.

<sup>5</sup> J. Stewart and F. Eggleston, "The Mathematical Characteristics of Sun-Spot Variations II," *Astrophys. J.*, 91, 72, 1940; "A Prediction of the Remaining Course of the Present Sunspot Cycle," *Phys. Rev.* 55, 1102, 1939; "The Mathematical Characteristics of Sunspot Variations," *Astrophys. J.*, 88, 385, 1938.



prediction was communicated to the Central Radio Propagation Laboratory in a note dated June 14, 1946. The points indicated by the triangles in Fig. 2 are known as ionospheric sunspot numbers and represent a measure of the sunspot activity obtained from the characteristics of the ionosphere as observed at various ionospheric monitoring stations throughout the world.<sup>6</sup>

We turn now to the consideration of the effects of this sunspot activity on high-frequency radio transmission. These effects are very numerous. It has been found that the intensities of radio waves propagated over a particular path via the ionosphere and the intensities of the radio atmospheric noise observed at particular receiving locations vary synchronously with sunspot activity. But the most remarkable and detailed correlations are found between sunspot activity and the maximum radio frequencies (m.u.f.) which may be used for transmission over a particular path. The maximum usable frequencies depend upon the length of the transmission path, being

<sup>6</sup> This method is described in detail by M. L. Phillips, "The Ionosphere as a Measure of Solar Activity," Report No. IRPL-R26, prepared in the Interservice Radio Propagation Laboratory, National Bureau of Standards, Washington, D. C.

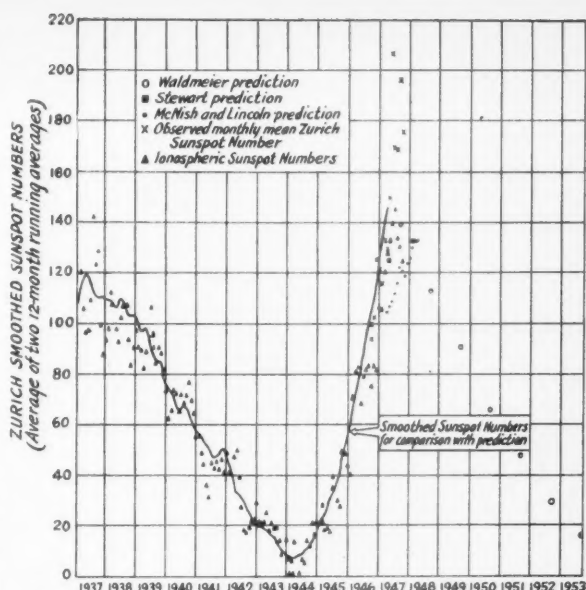


Fig. 2 — Recent values of sunspot activity with predictions for coming months (NBS-CRPL chart).

greater for the longer paths up to 4000 kilometers and decreasing somewhat for still longer transmission paths. Fig. 3 shows an example of the close correlation between the sunspot activity and the maximum frequency usable at noon in November for vertical incidence and for 4000-

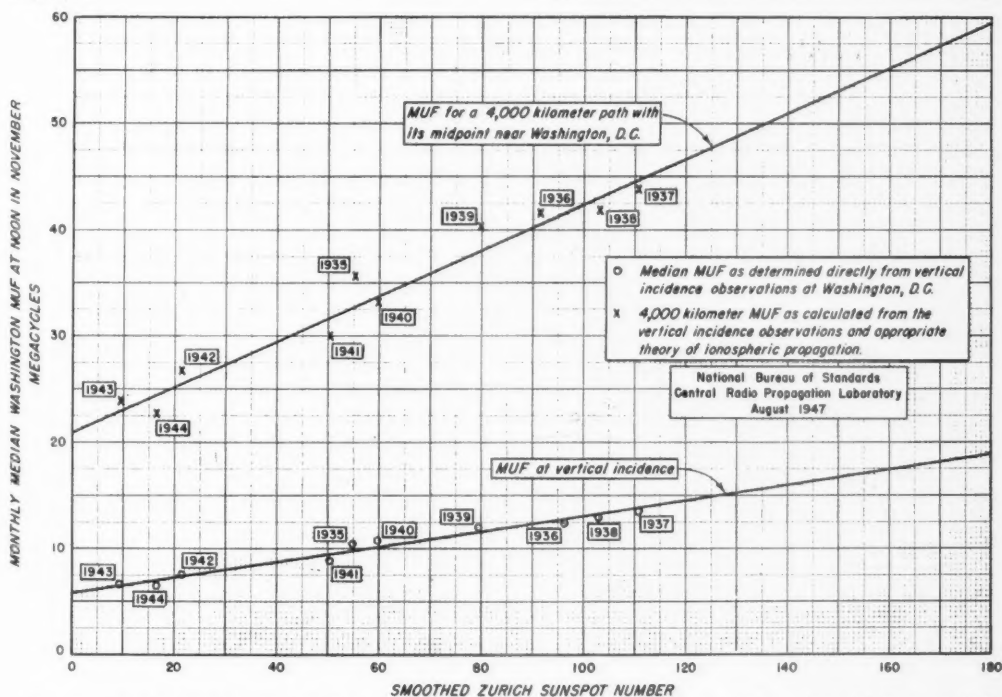


Fig. 3 — Correlation of the median Washington noon maximum usable frequency for November with the smoothed sunspot number.

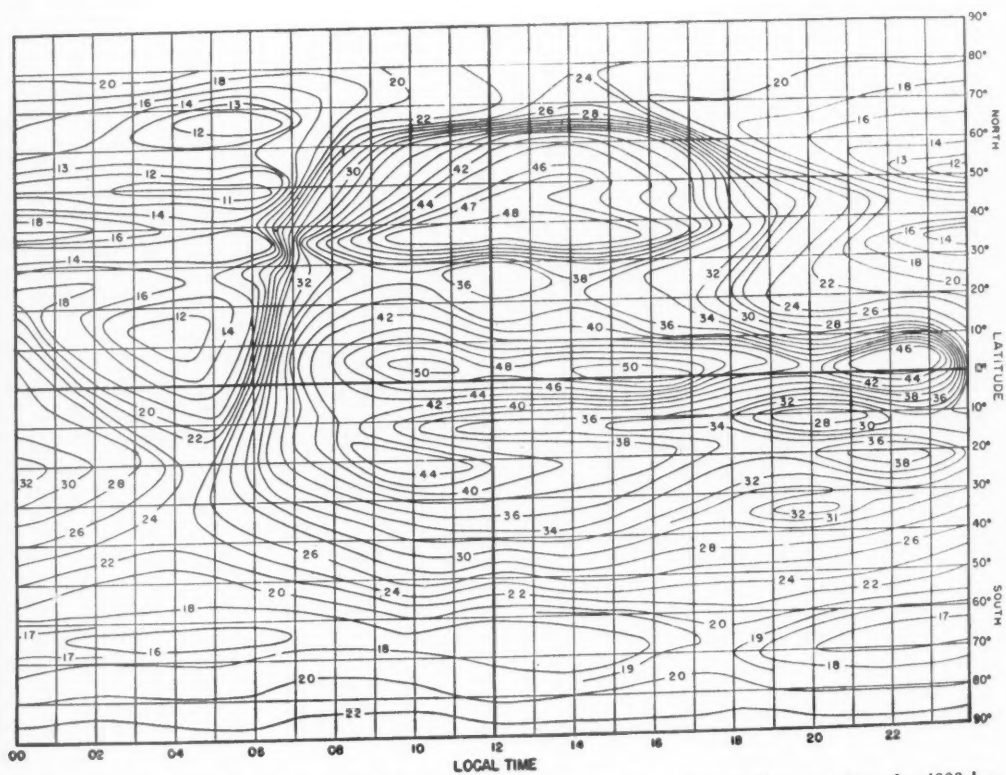
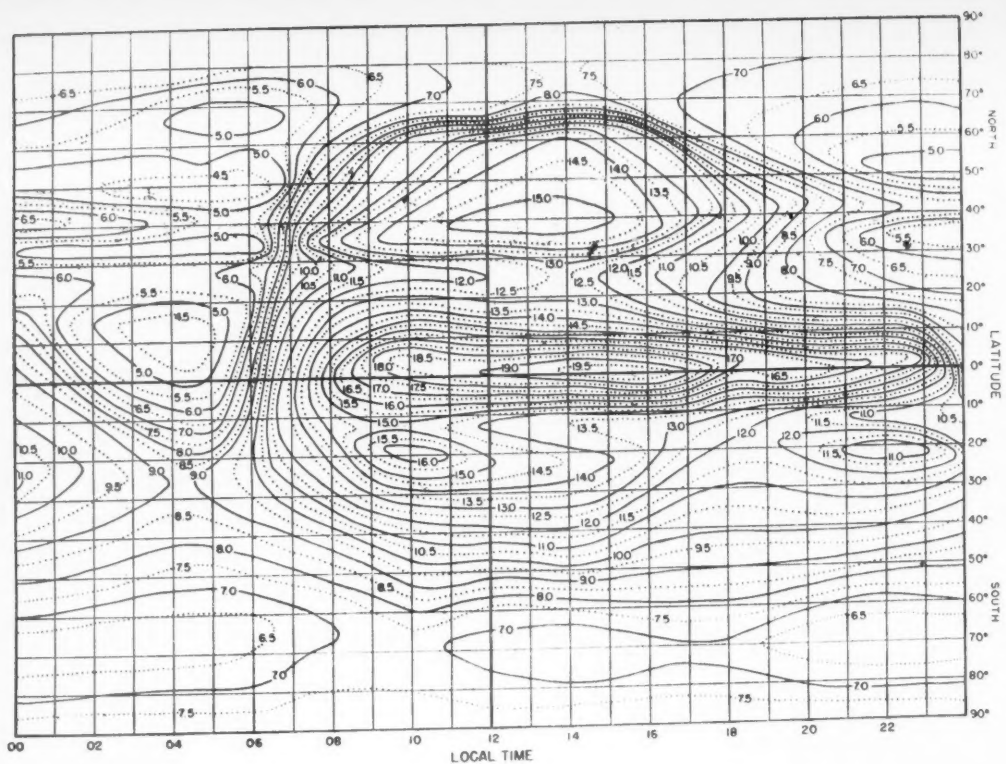


Fig. 4 —  $F_2$ -layer maximum usable frequency in megacycles. (Above, vertical incidence; below, for 4000 km. Both W-zone predictions for November 1947.) (NBS-CRPL chart.)

kilometer transmission paths with their midpoints near Washington, D. C. The maximum usable frequencies at vertical incidence were determined by observing the highest radio frequencies which will return to the earth after reflection at the ionosphere; these determinations were made by transmitting short pulses of energy vertically upward and observing the reflected pulses on a receiver located at the point of transmission and, in fact, sometimes using the same antenna for reception as for transmission. The maximum usable frequencies for the 4000-kilometer path are values estimated from the vertical-incidence observations and a theory of oblique-incidence propagation which has been found to agree well with experience.

The maximum usable frequencies also depend upon the geographical location, the season and the local hour, being highest near the middle of the day. By studying the vertical-incidence data reported from observing stations all over the world<sup>7</sup> and by making use of relations such as shown in Fig. 3 together with the predictions of future sunspot activity, the Central Radio Propagation Laboratory at the National Bureau of Standards prepares monthly charts for the calculation of the maximum usable frequency on any transmission path and for any time of the day. The charts are published three months in advance of the month for which predictions are made. They are contained in the monthly CRPL publication *Basic Radio Propagation Predictions*, obtainable from the Superintendent of Documents, Government Printing Office, Washington, D. C. Fig. 4 is an example of the charts available in this publication and gives the prediction of the maximum usable frequencies for November<sup>8</sup> in the geographical area comprising the W zone, which contains most of Canada and the United States, and all of South America. These charts give the maximum usable frequency for the latitude and local hour corresponding to the midpoint of the transmission path. Thus, we see that it should be possible to transmit radio waves across the United States on transmission paths more than 4000 kilometers in length during several hours of the day in November of this year on frequencies as high as 48 Mc. This is just a little below the amateur 50-54 Mc. band but we may nevertheless expect good cross-country transmission on this band for some days in

<sup>7</sup> A popular account of this work is given by J. H. Dellinger, "The Ionosphere," *The Scientific Monthly*, pp. 115-126, August, 1947.

<sup>8</sup> Unfortunately this article was received too late to include charts for December. — Ed.

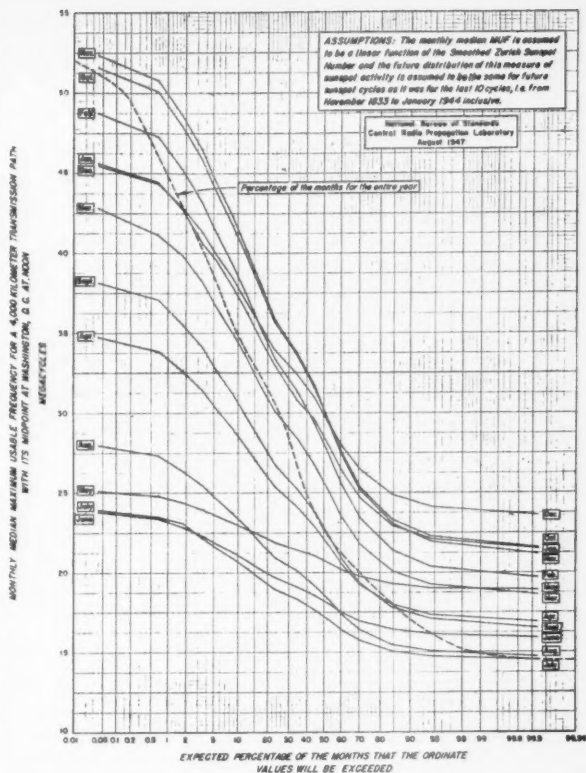


Fig. 5 — Expected future distribution of the Washington noon monthly median 4000-kilometer m.u.f.

November for the following reason: In Fig. 4 and throughout this report median values for the month are given and values as much as 15 per cent in excess of these median values may be expected on some days of the month. Furthermore, Fig. 4 is based upon a predicted value of sunspot activity represented by a smoothed Zurich sunspot number of 124. We see by Fig. 2 that the sun may possibly exhibit even higher values of activity than this in November. Thus, it seems quite likely that the amateur 50-Mc. band will be quite active for cross-country transmission during the coming winter months.

The maximum usable frequencies discussed in this paper are for regular transmissions via the  $F_2$  layer. As is well known, sporadic transmission may also take place via local concentrations of ionization, which occur from time to time in the  $E$  region of the ionosphere; these latter transmissions are, in general, weaker and less predictable than the  $F_2$ -layer transmissions and are responsible for cross-country communication only on very rare occasions since such long-distance contacts must involve two reflections in the  $E$  region, and thus require two appropriately-spaced local concentrations of ionization.

(Continued on page 110)

# The "Q5-er"

## An Outtrigger Amplifier for Real I.F. Selectivity

BY PHILIP S. RAND,\* WIDBM

THE other night, during a QSO on 75, the chap at the other end mentioned that his new receiver was so hot on 75, and all stations came in so strong, that at times he wished it had less sensitivity so that he could separate stations better. That remark made up our mind then and there to write this little epistle. "How long," we asked him, "has the sensitivity of a receiver had anything to do with the selectivity?" They are two different animals. We told him that what he wanted was not less sensitivity, but rather more selectivity. And that's what *all* receivers need today.

There have been many "preselectors" described in *QST* and other radio magazines, covering all sorts of gadgets from one-tube jobs to six-tube converters that are really complete new front ends for the ham receiver. However, there has been only one device described in recent years to make signals more readable, and that appeared in October *QST*.<sup>1</sup> It doesn't do much good to boost a signal 30 db. to an S9 unless it is Q5.<sup>2</sup>

A modern superhet receiver consists of three essential parts: the r.f. stage or stages, the i.f. stage or stages, and the audio. Of course, detectors, oscillators and power supply are necessary, but the gain and selectivity are obtained in the three sections just mentioned. The r.f. section has to be tunable so that it will amplify the desired station but, equally important, it must have sufficient selectivity to reject the image frequency. This means at least *two* stages, not one, of r.f. ahead of the first detector. Also, the first stage must be well designed, since it controls

• This article is not recommended to readers who never have any trouble copying 'phone signals during the peak operating hours in our 'phone bands, because the "Q5-er" can do them no good. It isn't even going to be much help to the "high-fidelity" merchant who insists on everything being flat out to 15,000 cycles. But if you would like to find out how to squeeze a few solid QSOs out of the band under "impossible" conditions, you will get plenty from the experiences WIDBM has had with his sharp i.f. amplifier. It can be attached to any receiver with only a few changes.

the over-all signal-to-noise ratio of the whole set. Only the four top-priced receivers meet this requirement. If you don't believe this, visit almost any amateur station and see the assortment of preselectors and converters being used to "pep up" what they thought was the latest word in receivers when they bought it. These same operators will rave about the improved signal-to-noise ratio, the lack of images, and will tell you they can now hear weak signals that were entirely missing on the receiver without the pre-selector or converter. This is definite proof of the need for a better front end in practically all of the usual run of amateur communication receivers. About now we can hear the reader saying "So what? I know all that, it's old stuff, and besides I have a red-hot converter and a couple of R9-ers." Well, that's the reaction we wanted, because it leaves the reader wide open when we reply, "O.K. So the signal is S9. But is it Q5? How about the second essential part of your receiver — what have you added to it?"

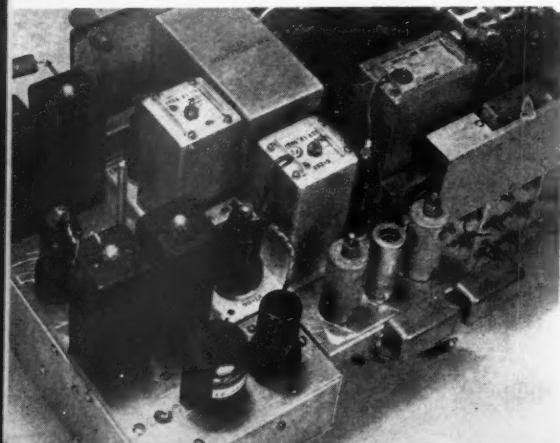
This second essential part of a superhetero-

A rear view of the "Q5-er" mounted on a BC-312 receiver. The 6C5 in the foreground is the oscillator that feeds the 6K7 mixer on the BC-312 chassis (note the second shielded lead up to the 6K7 grid cap). The oscillator-coil can and tuning-condenser shaft are to the left of the 6C5. The next two square cans are the first pair of 175-kc. i.f. transformers, followed by the 6K7 amplifier and the gain-control shaft and then the second pair of i.f. transformers. A partition under the chassis divides the oscillator and i.f. portions and, combined with a bottom plate, effectively prevents oscillator radiation. The small extra chassis to the right of the "Q5-er" is the outrigger "booster" amplifier.

\* RFD #1, South Norwalk, Conn.

<sup>1</sup> McLaughlin, "Exit Heterodyne QRM," *QST*, October, 1947.

<sup>2</sup> "Q5" is used here as the abbreviation for "QRK5," the maximum readability report in the International Q Signals. Many operators incorrectly refer to the readability as "QSA (1 to 5)" — which is the *strength* report in the same system. — Ed.



*QST* for

Dec



dyne, the i.f. amplifier, has the sole purpose of providing for the receiver sufficient gain and selectivity without adding a lot of ganged tuning controls. In other words, the i.f. amplifier is the part of your receiver that determines whether or not you can copy a given station in severe QRM. Many receivers only have one stage of 465-kc. i.f. amplification and get plenty of gain but no selectivity to speak of. Therefore, the use of more than one stage is to provide additional selectivity. It is a well-known fact that almost anyone can build a two-stage i.f. amplifier without any difficulty, but feed-back and oscillation troubles often start when three are attempted. At least one well-known high-priced receiver uses three i.f. stages for some added selectivity, but why stop there before the required amount has been reached? If more than two or three stages of i.f. give trouble on 465 kc., there is no law against converting this to a new lower i.f. of from 50 to 200 kc. and having several more stages.

This brings us to the reason for this article, namely, the inexcusable lack of selectivity that modern receivers have. The only reason we went to superheterodynes in the first place was to get higher selectivity. Today, with twice as many stations on the air, and the QRM more than twice as bad, what is the bandwidth of the new 1947 receivers? Just about the same as in 1935. And what is the usual excuse given? "Amateurs like to have nice quality so they can listen to the broadcast band." We say "Aw, nuts!" Right now, as we write, we are listening to a symphony over WQXR. Our receiver with a "Q5-er" is sharpened almost to the point of single-sideband reception, and the music sounds a lot better than it does on most of the small portables with which thousands of BCLs are satisfied.

At the present writing (set manufacturers take notice) there is not a single communication receiver on the market at any price that will cope with the QRM, because they are all designed to give almost broadcast-quality reception. True, most of the better ones have a crystal filter which helps a lot, but it is not the answer.

A crystal filter properly designed (and many of them are not), in a receiver that is properly aligned to the crystal frequency, will do a very good job. However, the tuning is critical, the phasing is tricky, and at best it will only take out one heterodyne at a time while keeping you as busy as a one-armed paperhanger trying to hold the thing in tune. It has a bell-like tone when shocked by noise impulses and key clicks, and sounds hollow when slightly off tune. As pointed out by McLaughlin,<sup>1</sup> the heterodyne structure gets very complicated, and when three signals beat with the desired signal they produce six heterodynes (this is a *mild* form of QRM). General hash and sideband splatter are even more complicated when they have several adjacent carriers to beat against. A simple answer to the

problem, therefore, seems to be an i.f. amplifier that is really selective, like the "Q5-er" — not 6 or 8 kc. wide at two times down, but only 1.5 kc. wide at two times down, 4 kc. wide at 10 times down, 6 kc. at 100 times down, and only 7.5 kc. at 1000 times down, combined with a variable-selectivity crystal filter. Yes, the crystal filter really works when you have a good i.f. to back it up. No matter what make of receiver you now have, you can make a very decided improvement in reception by adding a "Q5-er."

### Greater I.F. Selectivity

The design of this "Q5-er" started after the purchase of a BC-312-M and a BC-348-R, when it was discovered that, in the daytime, they would both pull in weak stations on 75-meter 'phone that the old reliable communication receiver could not even find in the noise. Yet in the evening, when QRM got bad, they were both more or less useless. It was decided to try to do something about it. The first step was to acquire a surplus crystal-filter unit from a BC-342 and install it in the 312. This helped but was obviously not the answer. After studying the circuit diagram, a loading resistor was noticed across one of the i.f. transformers, apparently to increase the bandwidth. It was decided to eliminate this resistor, and so the transformer was removed from the chassis and taken apart. After taking the shield can off and removing the resistor, it seemed like a good idea to space the windings farther apart, as they seemed to be overcoupled. This was done. The BC-312-M had noticeably better selectivity now, so the remainder of the i.f. transformers were taken apart and their windings were also spaced farther apart. To do this it was necessary to melt off the wax with an infrared lamp and slide the windings apart, so that the tuning slugs now tune from the inside out instead of from the outside in. After this was completed, the receiver was slightly better. However, the over-all gain was now reduced so that the audio had to be run pretty well up on most stations. The next step was to add a third stage of i.f., to bring back the gain. We did not need much gain, however, so it was thought that if we used two extra transformers for more selectivity and one Type 9003 miniature tube the whole works could be put on a little strip on the rear of the chassis. After this addition the gain was right back where it should be and the selectivity was still better. The old "312" could now be used at night on both 75- and 20-meter 'phone. Its measured selectivity was now better than that of a well-known expensive communication receiver.

The receiver was used for several weeks when suddenly the idea hit us that, if such a big improvement could be made so easily, possibly still more improvement could be made. Although no trouble had been encountered with oscillation, it was considered inadvisable to add more stages

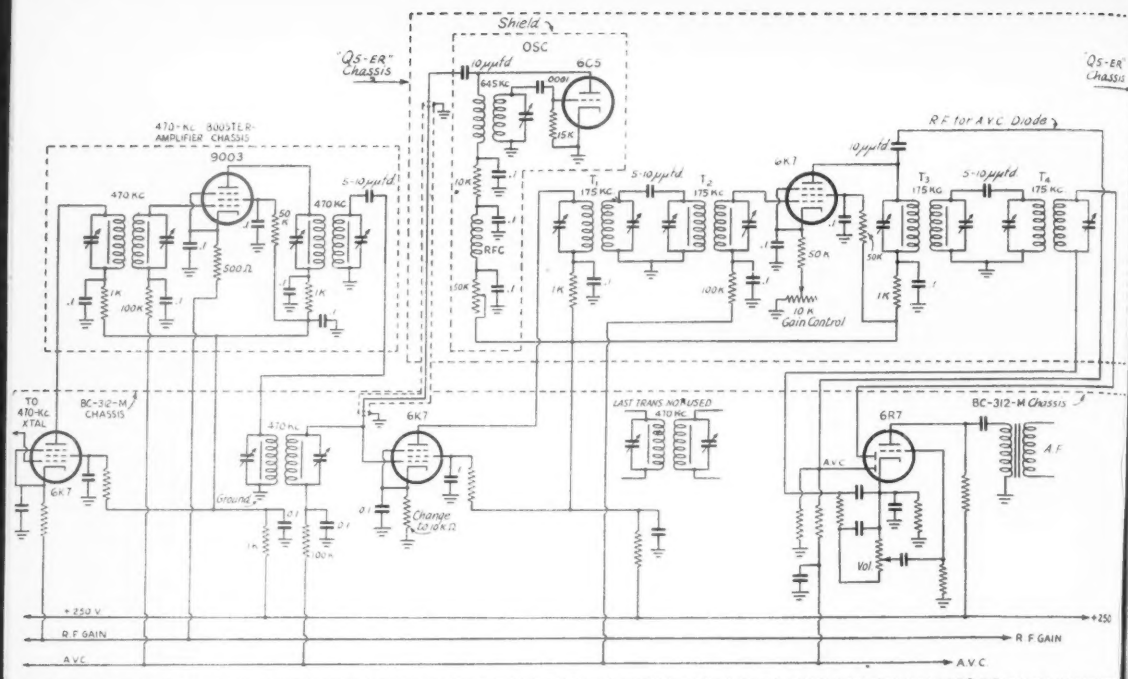


Fig. 1 — The circuit diagram of the "Q5-er" as added to the BC-312 at W1DBM.<sup>3</sup> The 470-kc. booster amplifier is also shown, but it probably isn't necessary if the "Q5-er" is used. The decoupling already in the BC-312 is used wherever possible. T<sub>1</sub>, T<sub>4</sub> — 175-kc. air-core transformer (Meissner 16-5702); T<sub>2</sub> — 175-kc. iron-core transformer (Meissner 16-5728); T<sub>3</sub> — 175-kc. iron-core transformer (Meissner 16-5730).

at 470 kc. Therefore the last i.f. tube was made into a converter to 175 kc., and the output was fed over to a new chassis. This new chassis contained the 175-kc. i.f. transformers and a 6K7. The last transformer was so placed that it could feed right back into the second detector of the "312." Ten minutes after the last wire was soldered in place we were listening to the 75-meter 'phone band, and it was an entirely new and different experience. The improvement is so great that you can tune in the same station on two receivers, one with and one without a "Q5-er," and when the QRM makes it impossible to copy the station on the receiver without the "Q5-er," you can switch to the other receiver and copy the station 100 per cent, relatively free from heterodynes and sideband splatter!

It is even possible to tune in either the high or low sideband (you only need to listen to one — they are both saying the same thing!) and of

course you pick the one that has the least QRM. If you are listening to a station that is relatively in the clear and a bad heterodyne appears, it can usually be eliminated simply by tuning to the other sideband.

There are two reasons for using a lower frequency. First, more tuned circuits are needed, and regeneration and oscillation may result if they are added to the present i.f. Secondly, more selectivity can be obtained at the lower frequency. We selected 175 kc. because reasonably good transformers are available on the surplus market or in various bargain basements. Aside from the i.f. transformers, no special parts are needed that won't be found in the average junk box, except possibly the oscillator coil. The one used here was a small shielded replacement b.c. oscillator coil that is fixed-tuned to around 640 kc., depending on your present i.f. The correct frequency is found by adding 175 to your present i.f. For example: 175 plus 465 equals 640.

### The Practical Circuit

Referring to the circuit diagram of the "Q5-er" in Fig. 1, you will note that two i.f. transformers have been used between stages instead of one, and in this way eight tuned circuits at 175 kc. have been added. You will also see that in this particular case the output of the "Q5-er" is fed

<sup>3</sup> Note that W1DBM took off for his a.v.c. ahead of the signal diode. This was done "to develop enough a.v.c. voltage for the receiver," according to the author. However, it is not a recommended procedure because, in any receiver where the a.v.c. circuit has less selectivity than the signal circuit, strong adjacent signals will take over the a.v.c. function. If not enough a.v.c. voltage is developed, it would be better to amplify the a.v.c. through an additional channel beyond the signal channel. If an S-meter is used, the a.v.c. channel can have more selectivity than the signal channel — otherwise tuning is easiest with equal selectivity. — Ed.

right back into the receiver, and the original second detector is used as the new third detector. This is not at all necessary and, in the case of certain receivers, it might be more desirable to build a third detector complete with a good noise limiter, b.f.o., a better a.v.c. system, and a vacuum-tube S-meter, and only feed the audio back to the receiver. A squelch circuit could also be added. We already have such a chassis under construction.

It should be mentioned that it will be necessary to change over the b.f.o. in the receiver to the new i.f. of 175 kc. No trouble of any sort was encountered in getting this "Q5-er" to perk right off the bat. It was far easier to build and wire than any preselector or converter, because lead length and placement of parts are far less critical at these low frequencies. The only part that should be well filtered and shielded is the 640-kc. oscillator. Also it should be run at as low a plate voltage as possible, consistent with good conversion, so that it will not scatter harmonics in the amateur bands. No trouble of this sort has been encountered so far, although we did take the precaution of shielding the entire oscillator section.

The coupling between each of the i.f. transformers is a small mica condenser of 5 to 10  $\mu$ fd. This is about what you will get by twisting the leads together for an inch, and it works just as well. If you use more capacity you will get more gain but less selectivity. The unit as described has a gain of very slightly more than one. The gain of the tube just about makes up what is lost by the transformer coupling. The i.f. gain control shown is used to set the over-all gain of the receiver to exactly what it was before the addition.

### General

It was mentioned earlier in this article that there were only four amateur receivers available that had front ends that would do a good job. This statement referred to new receivers priced between 300 and 600 dollars. However, fortunately for us, there are several surplus receivers available for under \$50 that have two r.f. stages and do an excellent job, in the front end. They fall down, along with the high-priced new ones, when it comes to selectivity, but with the addition of a "Q5-er" they do an outstanding job.

No article is complete without a couple of graphs or curves to baffle the unsuspecting, so Fig. 2 shows the selectivity of a BC-342 alone and a BC-312 with the "Q5-er" compared with some typical communication receivers.

If you want the utmost satisfaction in working in our crowded bands today, it is suggested you build the single-sideband unit in October QST. However, if you can't get the necessary parts or if you want to build something less complicated, then we suggest you build this "Q5-er" and prove

to yourself, as we did, that you can use more and more and still more selectivity in a communication receiver and make more effective use of our limited frequencies.

If a completely separate unit is desired there is no reason why the present second detector in your receiver could not be changed over to a cathode follower to feed a shielded line going to the "Q5-er" in a separate cabinet. This separate chassis would then consist of a converter to 175 kc. followed by one or two stages of i.f. and then a third detector plus audio, a.v.c., noise limiter, etc. This unit could be complete with power supply. This method would require the least digging into of the original set.

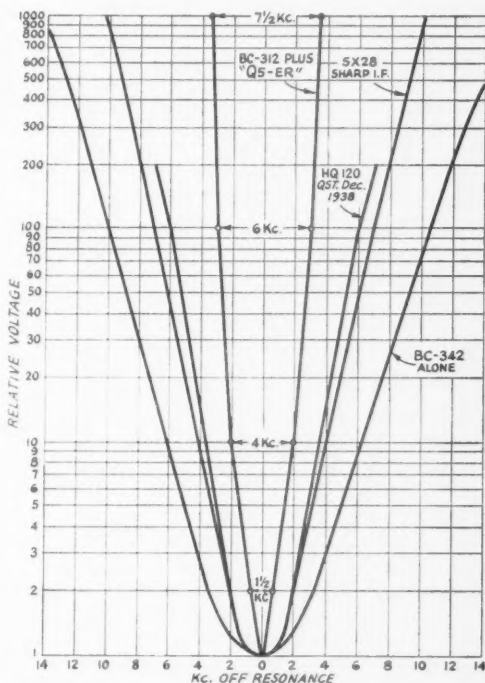


Fig. 2—A comparison of the over-all selectivity curves of two commercial receivers with the BC-312 before and after the addition of the "Q5-er." The superior selectivity of the "Q5-er" is immediately apparent. [Since the relative noise of the various receivers is approximately proportional to the area under their selectivity curves, one would also expect an appreciable improvement in signal-to-noise ratio with the "Q5-er," front-end noise figures being equal. — Ed.]

P.S.: About the third essential part of the receiver, the audio, we will let you worry about that, but don't overlook the fact that a good audio filter will work wonders on c.w., and a device such as the Hetrofil<sup>4</sup> will take out the last heterodyne that the crystal filter wouldn't touch.

<sup>4</sup> Woodward, "The Hetrofil — An Aid to Receiver Selectivity," QST, Sept., 1939.

# Let's Start Right on 1¼!

## Converting Previously-Described 144-Mc. Gear for 235 Mc.

BY CALVIN F. HADLOCK,\* WICTW

• As we have moved higher and higher into the radio-frequency spectrum, the tendency has always been to employ the modulated oscillator and the superregenerative receiver for the first efforts in a new band. Recent experience on 144 Mc. has demonstrated that little more than a waste of time (and some out-of-band operation) can result if we employ this approach in populating our 235-Mc. band. WICTW here shows that crystal control and superheterodyne reception are not at all difficult on the higher band, and his results with the equipment described speak for themselves.

**S**HORTLY after V-J day the writer, like so many others, joined the mad scramble to get on the air on 2½ meters, then the only band that was open for our use. At least it gave us a chance to operate and we could change to the more familiar low-frequency bands when they were made available. This band proved to be so interesting, however, and was so fraught with unexploited possibilities that, when it was changed from 112 to 144 Mc., we went right along with it. Except for occasional splurges on six meters, we have not as yet gotten around to operating on any of the lower-frequency bands.

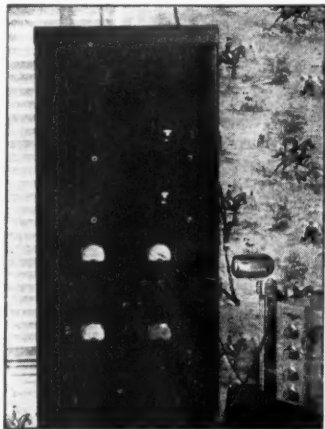
Starting with a modulated oscillator, superregenerative receiver and dipole, we have gone through a period of evolution ending with a crystal-controlled transmitter, superheterodyne receiver and 16-element beam. DX has grown from thirty or forty miles to several hundred, and many stations that were formerly considered DX are now thought of as "local." Looking for new lines of development, the 1¼-meter band, offering five megacycles of practically unoccupied space, looked inviting. Several of us in the Boston area had started to explore this band before the war put a stop to our activities, with local QSOs up to a few miles resulting, but in those days, ten miles or so was considered good DX!

Experience gained in changing from 112 to 144 Mc. indicated that the modulated-oscillator-and-superregenerative-receiver technique would most certainly produce inferior results on 235 Mc. Such gear would be more than proportionately unstable and inefficient. It was decided to start immediately with crystal-controlled transmitters

and superheterodyne receivers and by-pass the painful process of evolution which wasted so much time in the development of the two-meter band. It was felt that the present two-meter transmitter and receiver designs could be made to work on 1¼ by slight revisions and a more restricted choice of tubes. It was also felt that the one thing that would make the band really "go to town" would be the use of high-gain antenna arrays. The above assumptions have proved to be correct.

### Why 235 Mc.?

How would 235 compare with 144 Mc. and what advantages, if any, would it have over the lower frequency? Other things being equal, slightly *less* coverage could be expected on the higher frequency under "standard-atmosphere" conditions, with perhaps a somewhat more pronounced shadow effect. However, tropospheric-bending effects on 235 Mc. (temperature inversion, etc.) should be equal to or slightly more pronounced than on 144 Mc. In the size of the antenna lies the real opportunity for improvement. A 16-element beam on 2 meters measures about 10 feet by 7 feet, which is about as large an array as most hams care to erect. This beam seems large compared to an array of similar design for 1¼ meters, which is only 6 feet long and 4 feet high. The two arrays, however, have the same gain. If, for 235 Mc., another 16 elements is added above the first, we then have a *higher-gain* beam which is still only six by eight feet; smaller physically than the 16-element 2-meter array.



The 235- and 144-Mc. set-up at WICTW. The top panel of the rack contains the two "speakers, one for each of the two receivers mounted directly below. Next below the two receiver panels are the two transmitters. Modulator and power supplies are at the bottom.

\* % The National Co., Malden, Mass.



Back view of the 235-Mc. crystal-controlled transmitter. At the right is the push-pull 6AG7 oscillator-tripler stage and the push-pull 6L6G tripler. The 832 tripler is at the center and the 832 final amplifier is mounted horizontally at the left end of the chassis.



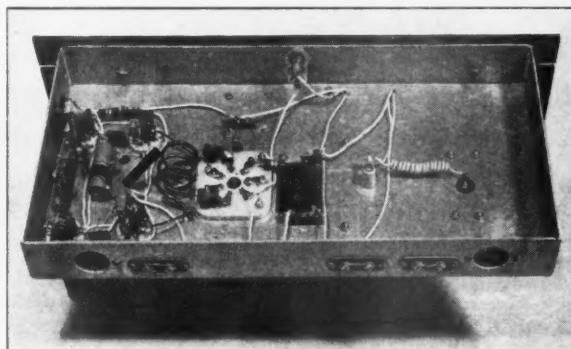
In the case of such arrays, if the area is kept constant (by adding elements if needed), the gain is approximately proportional to the square of the frequency. Thus, if the frequency is doubled, the possible antenna gain with the same physical size is quadrupled. If the same condition is also maintained at the receiving end, the gain of the circuit is proportional to the fourth power of the frequency ratio. For example, if the beam areas are kept the same, an antenna input power of 10 watts on 200 megacycles would produce about the same signal strength at the receiving end as 160 watts on 100 megacycles. This does *not* mean that a  $1\frac{1}{4}$ -meter dipole will give a stronger signal than a 2-meter dipole. It *does* mean that a 32-element  $1\frac{1}{4}$ -meter array will produce a stronger signal than a 16-element 2-meter array although it is actually a smaller antenna physically. All of this additional gain may not be realized as it is expected that the  $1\frac{1}{4}$ -meter gear may not be quite as efficient as that designed for 2-meter use. The use of 32-element instead of 16-element arrays at both ends of a given path, however, more than makes up the difference. Experience has shown this to be true.

#### Crystal Control with 4 Stages

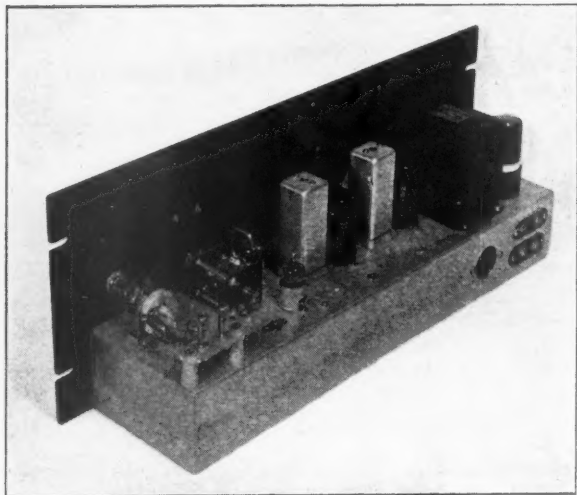
The 2-meter transmitter described in July 1946 *QST*, developed in conjunction with Ralph Hawkins, W1OEX, has worked out so well that the same basic ideas were used for the 235-Mc. job. The objective was to build a transmitter that would work reasonably well, with a minimum of time and effort, leaving further development for the future. The 829 tube appeared to be a rather large tube for this frequency and it was felt that it might be difficult to get enough drive to

make it work efficiently at the higher frequency, without extensive revisions in the exciter stages. On the other hand, the 832 seemed to be a natural for this band, so it was used as a push-pull tripler and also as a final amplifier, in place of the 815 tripler and 829 final used on 144 Mc. Ample drive is obtained for the 832 tripler and final, using a similar exciter, tubes, and power supply to those used previously. The prospective builder is referred to the previously-mentioned article for the circuit constants and layout of the first two exciter stages. This information also appears in the 1947 ARRL *Handbook*. Changes include the use of crystals whose frequencies lie between 8.71 and 8.88 Mc., and a reduction in the size of the coils  $L_3$  and  $L_4$ .  $L_3$  is reduced to 11 turns and  $L_4$  is a 3-turn self-supporting coil made of No. 14 wire. The tripler now uses an 832, with a similar tank circuit to that used with the 815, except that it has been shortened to  $2\frac{1}{4}$  inches high, to tune to 235 Mc. The tripler screen resistor,  $R_{11}$ , is 20,000 ohms. The three stages are supplied from the original power supply which gives 300 volts at about 175 to 200 ma.

The final amplifier using the 832 follows the original circuit except for the value of the grid and screen resistors ( $R_{13}$  and  $R_{14}$  are 20,000 and  $R_{16}$  25,000 ohms) and a reduction in the size of



Bottom view of the 235-Mc. transmitter.



Rear view of the 235-Mc. superhet receiver. Parts layout and circuit are similar to the receiver described by W1CTW in March 1947 *QST*. At the left is the antenna input circuit, followed by the oscillator and mixer stages, i.f., superregen detector, and audio.

the grid and plate coils.  $L_7$  is similar to  $L_5$ , and  $L_6$  is made about one inch high. The final plate voltage is reduced to 300, as the no-load plate current at 400 volts was rather high. A minimum plate current, unloaded, of about 45 ma. is obtained. The antenna loads the final up to 90 ma., or about 27 watts input. The present tank is not as good as could be desired and it is necessary to tune for maximum output by means of a neon bulb rather than by the plate current dip, as maximum output does not coincide with minimum plate current. Doubtless, a good linear tank like that shown by W1EHT in December 1945 *QST* would show an improvement in this respect, but the arrangement shown works and is convenient, so we did not see fit to spend time on this detail at present. The output appears to be about 13 or 14 watts, an efficiency of about 50 per cent, which seems reasonable for this frequency.

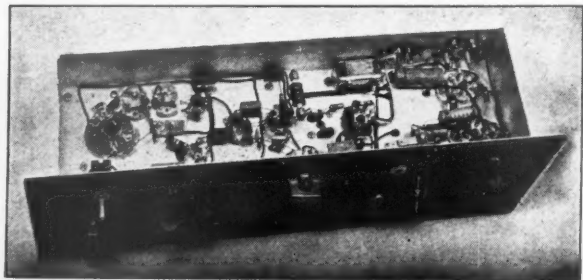
#### The Revised Receiver

The receiver is a revised version of the 2-meter receiver that has seen service in the writer's station for nearly a year. The 2-meter version was described in detail in March 1947 *QST*. The audio- and intermediate-frequency amplifier sections of the receiver are identical with those of the 2-meter unit with the exception that, with a view toward getting somewhat broader selec-

tivity, the 10.7-Mc. i.f. transformers were replaced with  $18\frac{1}{2}$ -Mc. transformers. The original 10.7-Mc. units could be used with equally good results, however, and they are more readily available. For the best signal-to-noise ratio and selectivity, particularly on weak signals, the detector is operated at a point just below regeneration. For broader selectivity and good a.v.c. and noise-limiting action, it is operated with superregeneration. Oh yes, you can hear plenty of ignition noise on  $11\frac{1}{4}$

meters!

The converter section is similar to that of the 2-meter receiver except that smaller coils are used and a 9002 tube was substituted for the 6C4 in the high-frequency oscillator. All r.f. and oscillator coils are reduced to half-turn loops. As before, the oscillator is on the low-frequency side of the signal frequency. A 954 tube is used in the r.f. stage and, as was done previously, two tuned circuits are used between the r.f. stage and the 6AK5 mixer input. These two tanks are coupled to produce a bandpass effect and are fixed-tuned. They are *not* "stagger-tuned" but rather are overcoupled as necessary. The antenna condenser is peaked up in the middle of the band and then left in this position. In normal operation, only the high-frequency oscillator is tuned. It is quite a chore to adjust the tuning and coupling of the double-tank arrangement to produce the desired bandpass characteristic, and an accurately-calibrated signal generator is necessary. When finished, however, a practically flat response 8 Mc. wide was obtained, providing ample leeway beyond the limits of the band. Although an r.f. stage is a definite improvement, it can be omitted and good performance would still be obtained. This would greatly simplify alignment of the receiver, but the r.f. stage is worth the added effort if one has the equipment needed to



Under-chassis view of the 235-Mc. receiver. At the left is the 954 r.f.-amplifier tube. Its plate circuit, and the grid circuit of the mixer stage, are at the back, above and to the right of the acorn-tube socket.

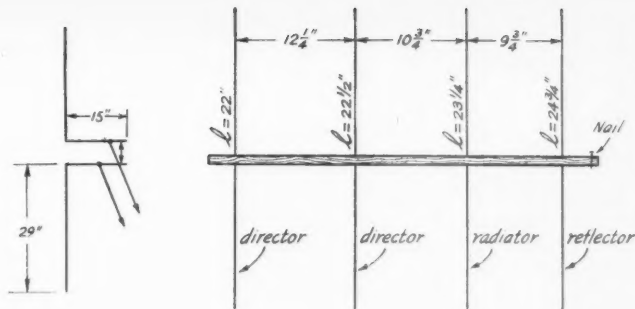
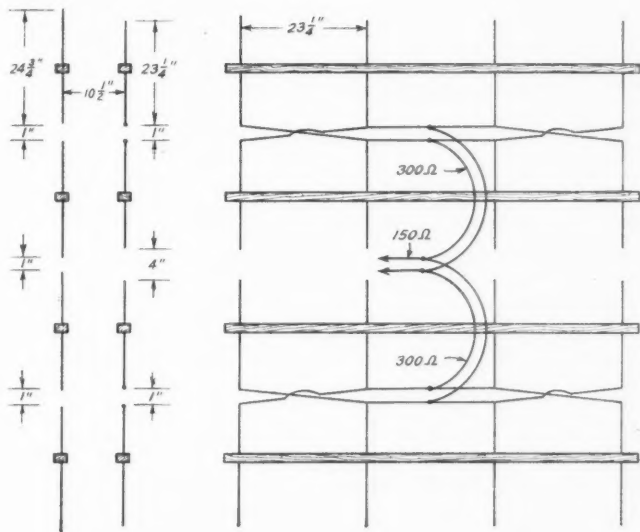


Fig. 1 — Antenna systems for 235 Mc. At the upper left is the simple extended double-Zepp. At the right is a four-element parasitic array, which may be fed with a delta match and mounted either horizontally or vertically. It may be pivoted on a nail at one end. Below is a 32-element system, showing the method of feeding described in the text. One half of this could be used as a 16-element array, in which the feedline would be of 300-ohm line throughout.



perform the alignment properly. When the receiver is operating below regeneration without an antenna connected, a definite noise peak is heard when the antenna trimmer is tuned through resonance. The image ratio is about 55 db.

#### Antennas for 235 Mc.

After the receiver and transmitter were finished the possibility of a W2 contact provided the incentive to rush work on a 16-element beam. This antenna was built and erected in two nights, the project being slowed somewhat when W1PIJ slipped off the attic window and stuck his leg through the bedroom ceiling up to his knee! However, the beam was finally lashed in place in a fixed position pointed at New Jersey, the immediate objective being W2HWX, Little Silver, N. J., about 15 miles beyond the present record.

The 16-element array was made of 1-inch wooden framework and 3/8-inch aluminum tubing. The rods were mounted by driving them into slightly smaller holes bored in the wooden cross-sticks to give a tight fit. They could be pinned if desired. The elements are short enough to be

solid when supported only in the middle, eliminating the need for insulators of any sort. The vertical and horizontal wooden-frame members are mounted halfway between the elements. Lugs were mounted at the inner ends of the radiators for the phasing sections, which were made of No. 14 enameled wire. A 300-ohm feeder is connected to the middle of the center section.

To construct a 32-element beam, a duplicate 16-element array is made, including its own separate 300-ohm feedline as before. This is mounted above the first array by using vertical frame members long enough for both. Oblique bracing in all three planes should be added as needed to make a solid

framework which is then mounted on a strong center pole. The reflectors of each array are 1 1/2 inches longer than the radiators and will extend above and below the radiators by that amount. If the reflectors of the two arrays are mounted one inch apart, there will be four inches between the ends of the radiators of the upper and lower arrays. The two feeders from the arrays should be measured off to exactly the same length and then connected in parallel with each other and the main feeder, which should be 150-ohm line to match the impedance of the two 300-ohm feeders in parallel. This 150-ohm line is then brought down to the operating room to the receiver and transmitter.

About the time that the equipment described above was completed, W1DAH, North Scituate, R. I., was persuaded to build equipment and try to establish a 1 1/4-meter Massachusetts-Rhode Island circuit of some 45 miles. Ed had been trying a 15-mile path with modulated oscillators and superregenerative receivers, and was just about to give up. When his crystal-controlled

(Continued on page 118)

# • Technical Topics —

## 21 Mc. — An Appraisal

Now that the 21-Mc. band is in the bag — although, unhappily, more than a year off — it is interesting to speculate a bit on what it may have to offer us. Of course, it's more or less obvious that its characteristics will be somewhere between those of 14 and 28 Mc. But will it be more like "10" than "20," or vice versa?

It isn't hard to arrive at an answer, in the light of present-day knowledge of radio transmission and the ionosphere. There are only two kinds of propagation of real interest at this frequency — via the *F* or *F*<sub>2</sub> layer, and via sporadic *E*. Insofar as the former is concerned, all the data we need are given in convenient graphic form in K. A. Norton's article on sunspots in this issue.<sup>1</sup>

Fig. 5 of that article is particularly illuminating. In using it, it is necessary to keep in mind that the predictions it makes are based on conditions existing at Washington, D. C., and that while that location is probably representative of a large part of the United States, it is not typical of some other parts of the earth. (In general, conditions will be better toward the south.) Also, "maximum usable frequency" means that on half the days of the month the actual m.u.f. will be higher than the figure given, and on the remaining half of the days is expected to be lower. The range of variation is 15 per cent. Because of the variation, there will be *some* days of the month when the 21-Mc. band will be open although the predicted m.u.f. is only about 18 Mc. Since the predictions are somewhat conservative, any given frequency can be expected to be "open" to a greater extent than the chart indicates.

In the tabulation below, the figures in the first column show the number of years out of 10 in which long-distance communication can be expected to be reliable on 21 Mc. during the month given. The second column shows the number of years out of 10 in which the band can be expected to be open for at least some days during the month:

Month	Reliable	Occasional
January.....	10	10
February.....	9	10
March.....	8	10
April.....	6	8
May.....	5	10
June.....	1	5
July.....	1	4
August.....	2	5
September.....	6	8
October.....	10	10
November.....	10	10
December.....	10	10

This shows that there will be reliable DX work on 21 Mc. during the months October through January every year, regardless of the status of the sunspot cycle. February, March and May can be added to this "regardless-of-sunspots" group on the basis of lesser reliability. At peaks of the sunspot cycle (such as we are reaching now) the band will be reliable for DX all year round, while at a deep sunspot minimum it will be open only during the months October through January. At other parts of the cycle it will be open for a greater or lesser part of the year, depending on the status of sunspot activity. Actually, only June, July and August can be expected to be "dead" more years than they are "open."

A similar tabulation for 28 Mc. is interesting, in that it can be compared with our experience on that band. The comparable figures (with those for 21 Mc. shown in parentheses) are:

Month	Reliable	Occasional
January.....	5 (10)	7 to 8 (10)
February.....	5 (9)	7 (10)
March.....	4 (8)	6 (10)
April.....	1 (6)	3 to 4 (8)
May.....	0 (5)	* (10)
June.....	0 (1)	* (5)
July.....	0 (1)	* (4)
August.....	0 (2)	1 (5)
September.....	2 (6)	4 (8)
October.....	6 (10)	8 (10)
November.....	6 (10)	8 (10)
December.....	6 (10)	9 (10)

\* Less than one year in 50.

This table shows that there is practically no chance of reliable DX work on 28 Mc. during May through August, and only a very slim chance for occasional DX. As a matter of fact, the "occasional" is on the schedule for this season, if ever, because as shown by Fig. 2 of the Norton article the present sunspot maximum is expected to be the highest on record. The summer "dead" period is well borne out by our experience with this band. On the "reliable" basis, the prediction shows that the 28-Mc. band is a good DX band only during the winter months, and then only during 5 or 6 years out of ten.

Fig. 3 of the Norton article shows that a smoothed sunspot number of about 35 is required for an m.u.f. of 28 Mc. Fig. 1 of the same paper shows that the sunspot number was below 35 from the latter part of 1930 to the early part of 1935. This should have been the "dead" period

<sup>1</sup> K. A. Norton, "Sunspots and Very-High-Frequency Radio Transmission," *QST*, December, 1947.



on 28 Mc., at any time of the year. And the fact is that it was just that. Although the ten-meter band was not at all well occupied in those days, a small body of enthusiasts kept plugging away — and except for one or two obvious “freaks,” no  $F_2$  DX was reported between March, 1930 and March, 1935. Both before and after those dates the band was open for international work. So it appears that the tabulation above checks pretty well with such experience as we have. It is unfortunate that we missed the last sunspot minimum, because according to the same method of figuring, the band should have been dead from mid-1942 to mid-1945. At the time of our going off the air in '41 and returning in '46 the sunspot number was in the region of 60, which is high enough to support communication well above 30 Mc.

Although not as predictable as  $F_2$  transmission, sporadic-E propagation on 21 Mc. can be expected to be more prevalent than on 28 Mc. and less so than on 14 Mc. Again harking back to the

28-Mc. band of the early '30s, the records show that there was a considerable amount of this type of propagation during the years when the band was dead for  $F_2$ . It would have been better on 21 Mc. Since sporadic-E is most frequent during the summer months, this type of transmission will help fill the gap, between May and August, that will exist in  $F_2$  transmission in the years when sunspots are low.

Altogether, it looks as though there aren't going to be many dull moments on 21 Mc. It's a sure shot for winter DX, better than 50-50 for all other months except the vacation season, and with high probability of sporadic-E at any time at all. According to current predictions, we'll be about midway on the downslope of the present sunspot cycle when we're able to move into it, so our first taste of 21 Mc. will be of “average” conditions; in other words, solid  $F_2$  transmission from September through May and an excellent chance of getting it throughout the year. It ought to be good! — G. G.

## How High Is an Inversion?

THE idea still persists that great height is important in long-distance v.h.f. work, despite the fact that all our v.h.f. records beyond 200 miles have been made by home stations, most of them close to sea level. From W1KXP we have an interesting report of tests made during routine flights by planes of Northeast Airlines, giving evidence that it is entirely possible to go too high in search of that “ideal location” for v.h.f. record-breaking attempts.

As ground-station radio operator at Boston, W1KXP has ample opportunity to observe changes in v.h.f. propagation, as planes and ground stations use a frequency of 130.3 Mc. whenever conditions permit communication on that frequency. Southbound flights from Boston usually remain on v.h.f. until they reach the vicinity of Middletown, Conn., about 100 miles distant, and midway along the route to New York. On the night of June 5th-6th the New York flight was S9-plus at 2500 feet near Middletown, so they remained on v.h.f. for check purposes. Over Bridgeport, 40 miles farther on, the signal was still very strong, and the temperature aloft was three degrees above the ground reading. A climb to 3500 feet with continuous altitude readings provided a check on signal levels, as follows: 2700 feet — S8, 3000 feet — S6, 3200 feet — S4, 3500 feet — nil! A return to 2500 feet restored the signal to S9-plus. The temperature at 3500 feet was 75 degrees, 10 degrees above the ground reading. The last v.h.f. check was made at 1500 feet over Port Chester, just north of New York, at which time the signal was still S7 at Boston.

Shortly after midnight a northbound flight was

worked by the Boston ground station as low as 1000 feet near Bangor, far beyond the customary v.h.f. range. On a climb out of Bangor, signals were recorded as follows: 1000 feet — S2, 1500 feet — S7, 2000 feet — S8, 2500 feet — S9, 3000 feet — S7, 3500 feet — S2, 4000 feet — nil! These two flights worked one another that night while more than 300 miles apart.

Support for the proponents of early-morning v.h.f. activity is given by W1KXP with reports on the morning of July 23rd, when ground stations heard strongly at Boston at 8:00 A.M. included Worcester, New Bedford, Hyannis, Nantucket, Martha's Vineyard, and Portsmouth, N. H. At 8:00 A.M. the ground temperature at Bangor was 64 degrees, but at 1800 feet it was up to 80! Conditions remained good until shortly after 9:00 A.M., when things returned rapidly to normal, with only Worcester and Portsmouth remaining audible, and these were well down. Flights then also faded out at the normal points, about 100 miles distant.

The distances mentioned are not DX, in terms of amateur work on 144 Mc., for all this work is done with nondirectional ground plane antennas, but the figures given do show something of the tremendous difference in signal levels caused by sharply increasing temperature gradients in the first few thousand feet above the earth's surface. They also show us why it is foolhardy to head for Mt. Washington, a 6300-foot elevation, when the aim is to set a new world's record on a v.h.f. band. Present-day v.h.f. records are made by alert operators who take advantage of fortunate atmospheric conditions. The line-of-sight idea belongs to a bygone era. — E. P. T.

# Building a Code-Practice Receiver

*A Two-Tube Regenerative Circuit with Built-In Audio Oscillator*

BY RICHARD M. SMITH,\* W1FTX

**T**HIS article is aimed at you fellows who want to become hams. Its express purpose is to aid and abet the efforts of our friend, the radio bug, in whose grasp we are all hopelessly (but enjoyably) enmeshed.

Perhaps you've been shopping around for a receiver to help yourself learn the code. You don't want to spend a lot of money for it, and are a little awed by the seeming complexity of the circuits often appearing under an attractive title like "A Simple Umptey-Ump Tube Single-Signal Super for the Beginner." As a result, you're stymied. Pop can't spare the \$200 for that nice shiny communications receiver down in the store window, and you just haven't had enough experience to want to tackle the construction of an elaborate receiver yourself. Hence you don't do anything about it, but continue to listen in on the ham bands on the all-wave broadcast set, eating your heart out wishing that you could get on the air yourself. Described below is a little receiver that will help you along the road toward a license. It isn't the best receiver in the world, yet it will enable you to tune in on a goodly chunk of the short-wave spectrum for code practice. In addition, it has a built-in audio oscillator that you will need when you advance to the point where you are getting ready to go before the FCC examiners for your license. It doesn't cost much, about \$20 at current prices, but you can probably cut this down to next to nothing if you have a few friends who are hams. Almost every ham has a so-called "junk box" that will contain a large share of the parts you will need. What's more, if you let your friends know that you are seriously interested in building it, they'll probably kick in with a gift or two to help you out, and will be glad to help if you have trouble making it work.

\* Technical Assistant, *QST*.

• Among the first things built by most newcomers to ham radio are a simple receiver and a code-practice oscillator. Here's a low-cost unit that combines the functions of both without circuit complications.

Once you have built it, you will be able to receive the code-practice transmissions from WIAW and other cooperating amateurs, and stations sending news at speeds that are slow enough for you to use as code practice. Using the oscillator, you will be able to practise sending to develop a good "fist." In addition, you'll have learned that it isn't so difficult to build a simple receiver after all!

The general appearance of the receiver and its power supply is shown in Fig. 1. On the front panel are an inexpensive vernier dial (National Type K) for bandspread tuning, a band-setting knob used to select the segment of the frequency spectrum you wish to cover with the bandspread dial, a regeneration control to adjust receiver sensitivity, a toggle switch to change the circuit from receiver to code-practice oscillator, and a volume control. When the unit is used as an oscillator, the volume control acts as a tone control so that the tone of the "signal" heard may be adjusted to suit your own ear.

On the rear edge of the chassis are a terminal strip for connecting the receiver to its power supply, and jacks for the headphones and the key. The tuning condensers are mounted on the rear of the aluminum front panel, while the coil and the tubes plug into sockets on the chassis. An antenna post is provided near the rear on the chassis surface.

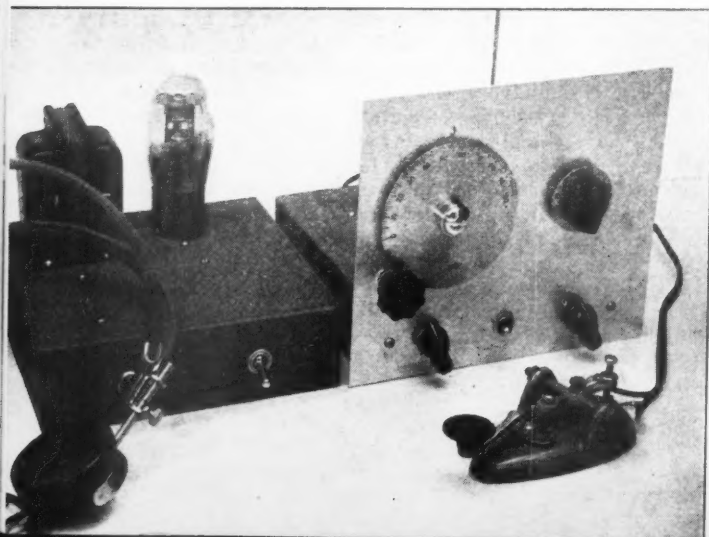


Fig. 1 — The code-practice receiver with its power supply. Headphones and the telegraph key plug into jacks at the rear of the receiver chassis. The tuning controls, from left to right, are: top row, bandspread tuning dial, band-set knob; bottom row, regeneration control, receive-send switch, and volume control. A rod antenna is used to obtain maximum selectivity and freedom from undesirable antenna effects encountered with some long wires.

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The circuit uses a 6J5 in a standard regenerative detector circuit, followed by a 6SN7GT dual triode connected as a two-stage audio amplifier. The 6SN7GT is converted to an audio oscillator by a switch that connects a feed-back condenser between the output and input circuits, causing oscillation to take place. The tone is variable over a wide range, keys smoothly, and is clean-sounding, closely resembling an actual received signal.

The output circuit is designed to work with either crystal or magnetic headphones. Slightly better performance will be obtained with the high-impedance type (3000 ohms or more) than with the 600-ohm variety, but either is usable. The headphones carry no d.c. potential, thus eliminating the shock hazard present in other circuits.

The receiver uses four plug-in coils to cover the range from 2.5 Mc. to 32 Mc. This range includes the 80-, 40-, 20-, 11- and 10-meter ham bands. The coils are designed to give adequate bandspread so that tuning will not be critical.

A 2½-foot rod antenna is shown mounted on the antenna post at the rear of the receiver. This short length is entirely adequate for the reception of signals at night, and in fact serves to add to the selectivity and stability of the set, because it prevents strong signals from "blocking" the detector. For daytime operation, a longer antenna hung up in the room, in the attic, or in the clear outside if space permits, is suggested. More details on this subject are discussed in a later paragraph under the heading "Operating the Receiver."

A power supply designed for use with the receiver is also shown in the photographs. It uses a small inexpensive transformer, a Type 80 rectifier and the filtering components necessary to reduce hum. This type gives better performance with a regenerative receiver than the slightly less-expensive "transformerless" type.

### Construction

The receiver is built on a standard 7 × 7 × 2-inch steel chassis finished in gray wrinkled enamel. The front panel is a sheet of ⅛-inch aluminum, 8 × 7 inches. Location of the parts mounted on the chassis is shown in Fig. 2, along with dimensions indicating where the principal mounting holes are to be drilled. The only tool needed that is not usually available in most tool kits is a punch for making the large holes for the tube and coil sockets. These punches can be obtained at most radio stores, and are well worth the few dollars that they cost, because with reasonable care in use and handling they will last for years. The 1¼-inch punch is the best investment, because most manufacturers have 1¼-inch sockets as standard items.

The location of the holes that must be drilled should be marked out first. Tape a piece of wrapping paper on the surface of the chassis to serve as a template on which the location of the holes can be marked. (If the chassis was wrapped when you bought it, leave the paper on it until the holes have been drilled.) This will keep the paint clean and unchipped. Next mark the location of the panel holes in pencil on the aluminum panel. Drill the holes in the surface of the chassis first, then the rear and side edges, but leave the front edge until later. Next drill the mounting holes for

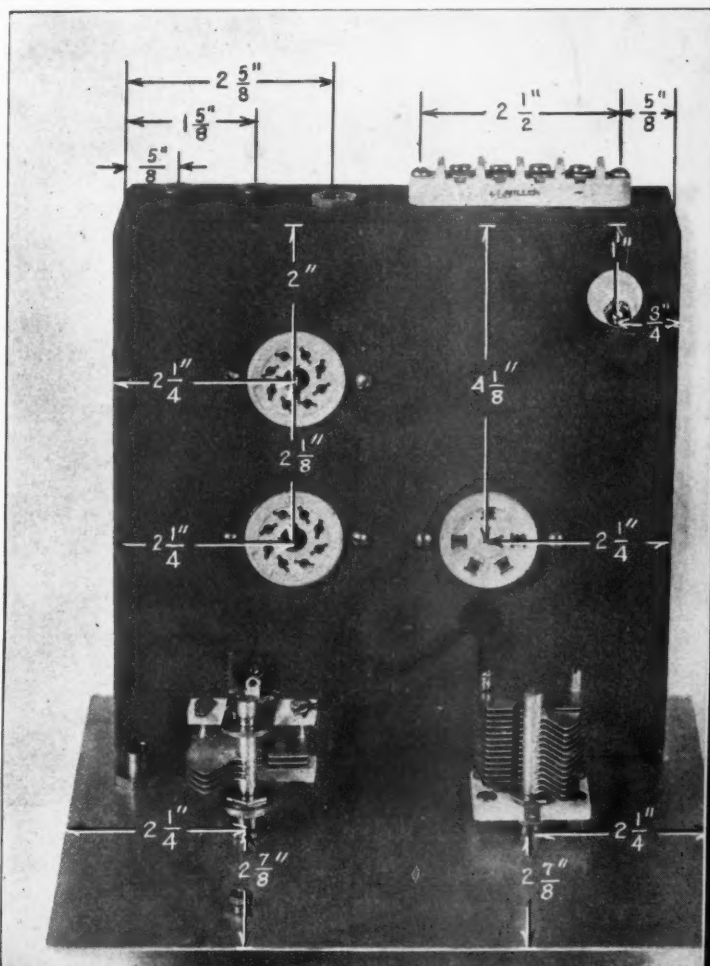


Fig. 2—Top view of the receiver chassis. In this view, the socket for the 6J5 detector is at the lower left, above the bandspread tuning condenser. The 6SN7GT socket is near the rear of the chassis, and the coil socket is at the right above the band-set tuning condenser. The terminals on the rear chassis edge are, from left to right, the 'phone jacks  $J_3$  and  $J_2$ , the key jack  $J_1$ , and the terminal strip for connection to the power supply. The antenna terminal is in the upper right corner. Dimensions are marked on the photograph for location of holes.

the tuning condensers, the dial drive, the dial index, and the two small holes that pass the 6/32 machine screws which hold the panel to the chassis. Bolt the two pieces together, and then drill the holes for the regeneration condenser, the toggle switch, and the volume control, drilling through both pieces. This will assure correct alignment of the holes for the shafts of these parts.

The parts are then mounted in the positions shown in Figs. 2 and 3. One of the output jacks,  $J_2$ , must be insulated from the chassis. Small fiber washers for this purpose are usually provided with the jacks. The antenna post, as shown in Fig. 4, is a ceramic feed-through insulator (Birnbach 458) inserted in a  $\frac{5}{16}$ -inch hole drilled in the chassis. The rod antenna has a heavy-duty lug soldered to one end, and this lug is held to the top of the insulator by the 6/32 nut. The compression-type trimmer condenser is mounted beneath the chassis on the other end of this feed-through insulator.

### Wiring

The schematic diagram of the receiver is shown in Fig. 5. Wire the heater circuits of the tubes

first, using No. 18 solid "push-back" wire. The ground connections can be made to soldering lugs placed on the screws that hold the sockets to the chassis. After the heater circuits are wired, make the connections between the coil socket, the tuning condensers, and the regeneration control. These leads should also be made of insulated No. 18 solid wire, and should be supported so that they will remain rigid at all times. If they are able to move around or vibrate, the stability of the receiver will suffer when it is placed in operation. The two leads that run from the coil socket to the tuning condensers should pass through the chassis in a hole lined with a rubber grommet to prevent short-circuits. The remaining wiring may be put in without particular worry as to parts location, using Fig. 3 as a guide. The wire that runs from the grid of the first half of the 6SN7GT (Pin 1) to the center lug on the volume control should be enclosed in shield braid, and the braid should be connected to a ground lug close to each end to provide good shielding. The B-plus lead from the transformer primary runs directly from the transformer to the toggle switch near by on the front panel. One end of the feed-back condenser,  $C_9$ , is

supported on the toggle switch, the other end by an insulated tie-point located on one of the screws that mounts the coil socket. From this point an unshielded insulated wire runs around the edge of the chassis to connect to the plate contact (Pin 5) of the output-tube socket. All other leads from the switch run close to the chassis edge to the terminal strip at the rear of the chassis. The plate resistors for the first audio stage,  $R_4$  and  $R_5$ , are supported at their junction by an insulated tie-point mounted on one of the socket screws.

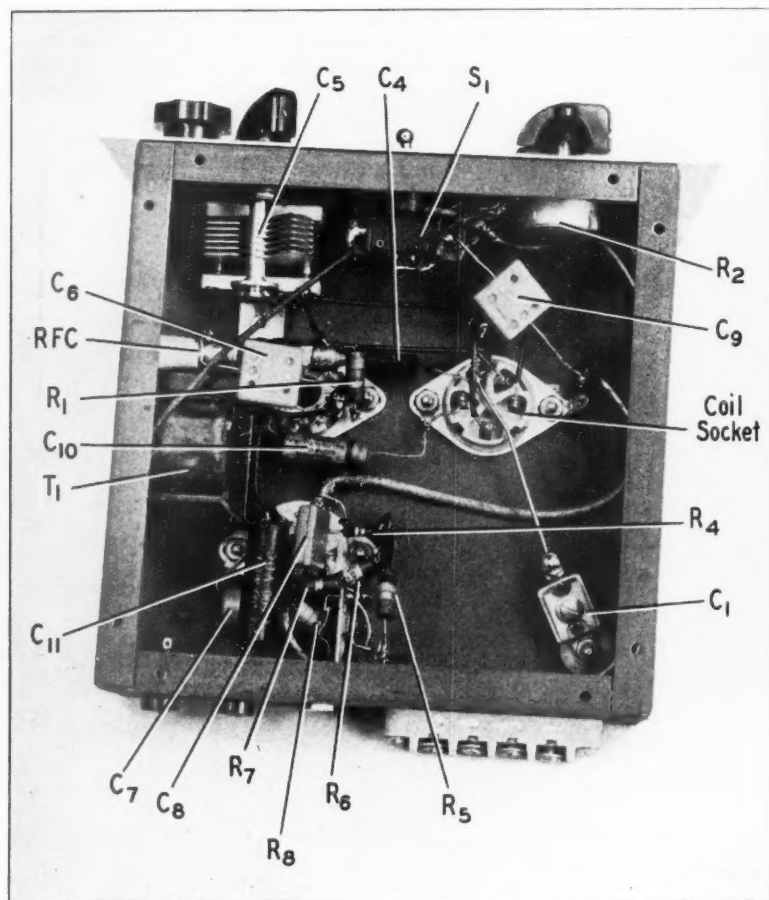


Fig. 3 — Bottom view of the receiver, showing parts location. Wiring instructions are included in text.



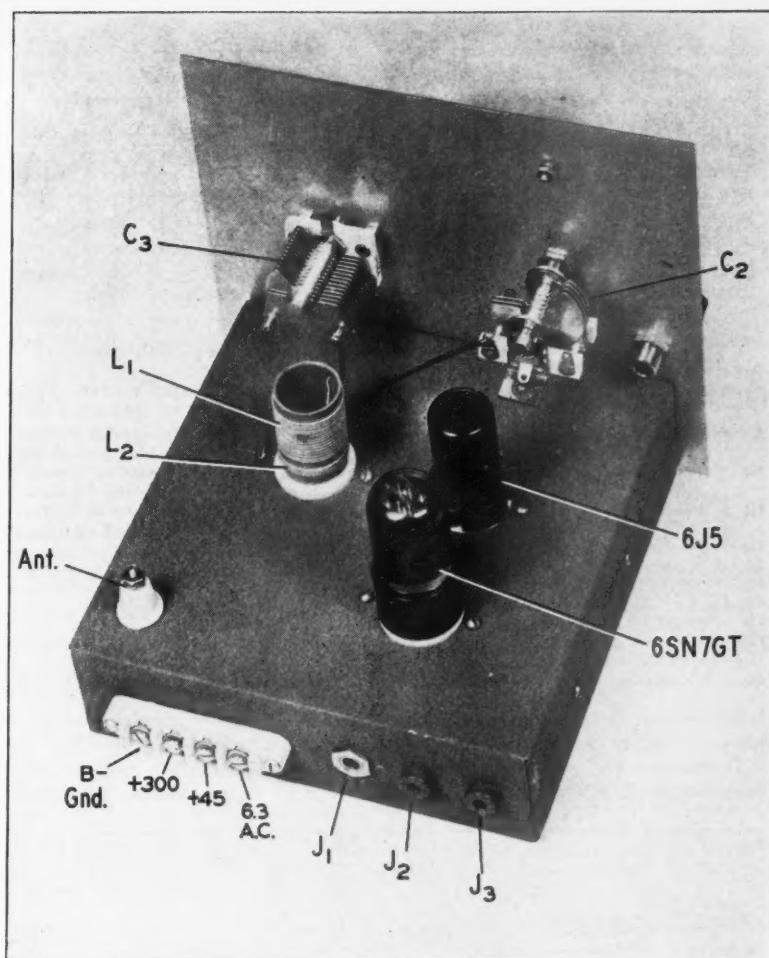
Fig. 4 — Rear view of the receiver. The band-setting condenser is behind the coil at the left. The 6J5 detector tube is nearest the front panel, with the 6SN7GT audio tube immediately behind it.

### The Power Supply

The power supply for the receiver is shown in Figs. 1 and 6. The transformer is mounted on top of the 7 × 7 × 2-inch chassis, its leads passing through grommets holes to the filter components mounted below deck. Parts placement is not at all critical, and may be arranged to suit the individual. The circuit diagram is shown in Fig. 7. The bleeder resistance is used as a voltage divider to provide the low voltage necessary for proper operations of the detector tube. All output voltages are brought to an insulated terminal strip on the chassis rear edge.

### Winding the Coils

The four plug-in coils used in the receiver are shown in Fig. 9. All are wound with No. 24 double-cotton-covered wire except the tickler coil  $L_3$  on the 80-meter coil, which is No. 30 d.c.c. The connections and winding data are shown in Fig. 8. The forms are standard 5-prong units, 1 inch in diameter, made of mica-filled bakelite (Millen 45005). The sketches in Fig. 8 show how to lay out the location of the holes through which the wires pass to reach the pins on the base of the coil form. In all except the 10-meter coil, each hole, made with a No. 55 drill, is located immediately above the pin to which the wire that passes through it is connected. Thus, the hole for the top end of the primary  $L_1$  is drilled directly above Pin 5, the hole for the bottom of  $L_1$  is drilled above Pin 4, and so on, as shown in the sketches. The 80-meter coil does not require a tap connection to Pin 3, so a jumper must be soldered



across Pins 5 and 3 inside the coil form to complete the connection to the bandspread condenser,  $C_2$ . This jumper should be put in place first. Strip the insulation from a 3-inch length of the No. 24 wire, form it into a "U," and push the open end into the coil form, holding it so that the ends of the wire pass through Pins 5 and 3. Pull the ends through, so that the closed end of the "U" rests on the bottom of the coil form. Then strip the insulation from the end of the piece of wire that is to be used for  $L_1$ , feed it through the hole in the side of the form, and down through Pin 5. Solder both wires inside the pin, and trim off any that protrudes from the bottom of the pin. The easiest way to solder to these pins is to apply the hot soldering iron to the open end of the pin with the form held so that the pins are in a horizontal position. After a few seconds, the pin will become hot, and a small amount of solder may be applied while the tip of the iron is still held to the pin. As the solder flows, capillary action will pull it up inside. Remove the iron, and

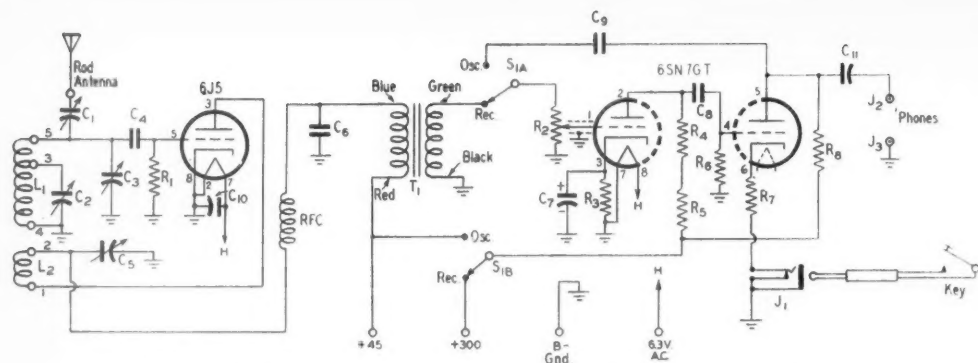


Fig. 5 — Schematic diagram of the code-practice receiver. Values of all components are given below. Coil-winding data are shown in Figs. 8 and 9.

C<sub>1</sub> — 3- to 30- $\mu$ fd. compression-type trimmer condenser (National M-30).  
 C<sub>2</sub> — (bandspread) 50- $\mu$ fd. receiving-type variable (Millen 19050).  
 C<sub>3</sub> — (band-set) 140- $\mu$ fd. receiving-type variable (Millen 22140).  
 C<sub>4</sub> — 100- $\mu$ fd. mica.  
 C<sub>5</sub> — (regeneration) 100- $\mu$ fd. receiving-type variable (Millen 19100).  
 C<sub>6</sub>, C<sub>8</sub>, C<sub>9</sub> — 0.0022- $\mu$ fd. mica.  
 C<sub>7</sub> — 10- $\mu$ fd. 50-volt electrolytic.  
 C<sub>10</sub> — 0.01- $\mu$ fd. paper.  
 C<sub>11</sub> — 0.05- $\mu$ fd. 600-volt paper.  
 R<sub>1</sub> — 4.7-megohm  $\frac{1}{2}$ -watt carbon.

R<sub>2</sub> — 0.25-megohm volume control.  
 R<sub>3</sub> — 4700-ohm 1-watt carbon.  
 R<sub>4</sub> — 0.1-megohm  $\frac{1}{2}$ -watt carbon.  
 R<sub>5</sub> — 10,000-ohm  $\frac{1}{2}$ -watt carbon.  
 R<sub>6</sub> — 0.22-megohm  $\frac{1}{2}$ -watt carbon.  
 R<sub>7</sub> — 1000-ohm 1-watt carbon.  
 R<sub>8</sub> — 47,000-ohm 1-watt carbon.  
 J<sub>1</sub> — Closed-circuit 'phone jack.  
 J<sub>2</sub>, J<sub>3</sub> — Tip jack.  
 RFC — 2.5-mh. r.f. choke (National R-100).  
 S<sub>1A-B</sub> — Double-pole double-throw toggle switch.  
 T<sub>1</sub> — 3:1 interstage audio transformer, single plate to single grid. (Thordarson 13A34).

hold the coil form firmly for a few seconds to allow the solder to harden.

In winding the coils, best results will be obtained if the far end of the wire is held firmly in a

vise, or looped around a nail driven in the bench, before starting. Then the wire is pulled taut, the coil form is rotated with one hand while the wire is guided into position with the other hand. You

walk toward the "anchored" end as you wind, keeping the wire under slight tension all the time. If the holes have been drilled as shown, and the wire is No. 24 d.c.c. as specified, the end of the winding should be reached adjacent to the hole that has been drilled for it. Grasp the form firmly at the bottom of the winding, cut the wire off, leaving

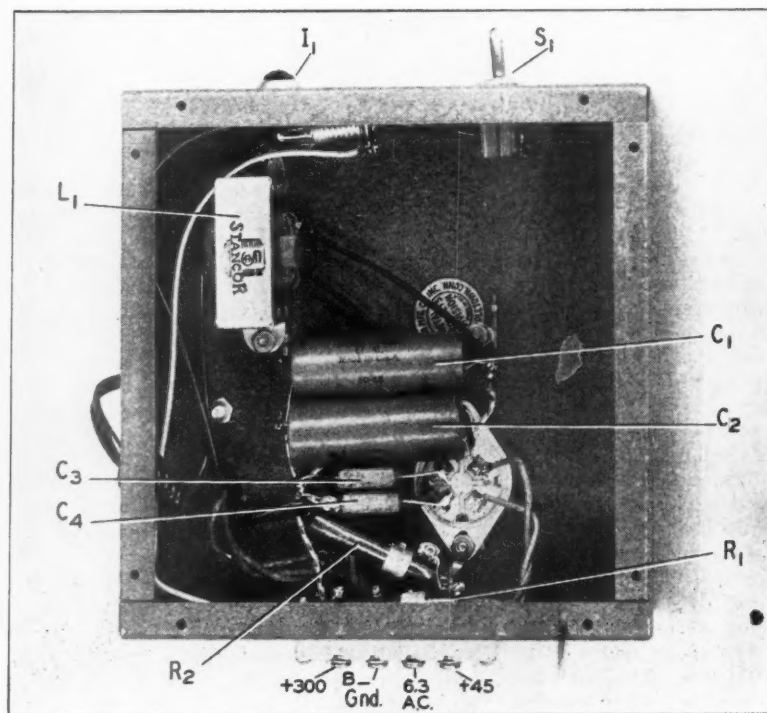


Fig. 6 — Bottom view of the power-supply chassis. The ground sides of the filter condensers C<sub>1</sub> and C<sub>2</sub> are connected to the chassis at one of the transformer mounting screws. All parts are identified in the photograph.

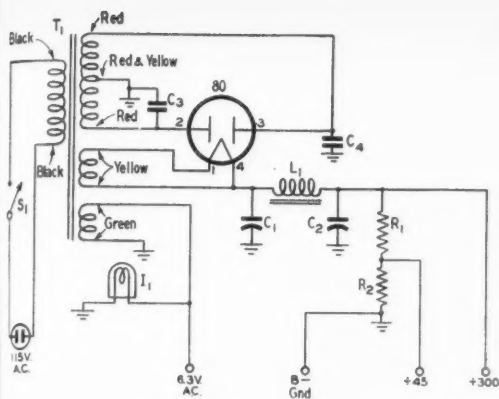


Fig. 7 — Schematic diagram of the power supply.

C<sub>1</sub>, C<sub>2</sub> — 8- $\mu$ fd. 450-volt electrolytic.

C<sub>3</sub>, C<sub>4</sub> — 0.0022- $\mu$ fd. mica.

R<sub>1</sub> — 25,000 ohms, 10 watts.

R<sub>2</sub> — 5,000 ohms, 10 watts.

L<sub>1</sub> — Midget filter choke, 8.5 henrys at 40 ma. (Stancor C-1279).

I<sub>1</sub> — 6.3-volt pilot-lamp assembly.

S<sub>1</sub> — Single-pole single-throw toggle switch.

T<sub>1</sub> — Replacement-type power transformer: 300 volts a.c. each side of center-tap, 40-ma.; 6.3-v. a.c. at 1.6 amp.; 5 volts at 2 amp. (Utah Y-640).

about 6 inches of it hanging free. Peel the insulation off all but the last quarter inch of this free end. Push it through the hole in the side of the form, bend it around, and push it through Pin 4 on the base of the form, all the while holding the turns in place with one hand to prevent them from slipping and spoiling the symmetry of the winding. After threading the end through the base pin, being careful to avoid kinks that will weaken the wire, pull it up fairly tight, and solder it inside the pin.

In winding the coils for the 40-, 20- and 10-meter bands, omit the jumper and make the tap connection first. A 4-inch piece of No. 24 wire is stripped, and is pushed through the tap hole in the coil form, thence down into Pin 3. Solder this end, and pull the free end tight. Cut off all but an inch that sticks out of the side of the form. Then wind the primary, being careful to space the turns so that the turn to which the tap is to be connected falls near the tap lead. This may take a little practice and several trials, but

it is important, because the location of the tap determines what the bandspread tuning range will be. The locations specified are designed to spread each amateur band over at least 60 divisions of the bandspread dial. If the tap is located too close to the grid end of the coil (top) the bandspread will be too small. If it is located too near the ground end (bottom), it will be too great. When the point to which the tap is to be connected is reached, scrape the insulation off the wire about  $\frac{3}{4}$  inch each side of the connection point, and wrap the end of the tap lead around the coil wire, pulling it up so that it will be tight when the winding process is continued. Solder the end (bottom) of the primary winding to Pin 4, and then put a drop of solder on the joint between

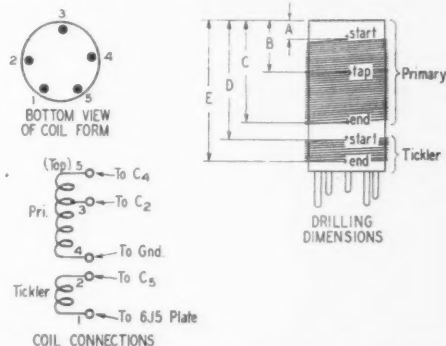


Fig. 8 — Coil-winding data. The sketches at the left show the arrangement of the windings and the numbers of the pins on the base of the coil form. At the right is a sketch showing the method of determining how far down the coil form a given hole should be drilled. The exact dimensions are listed below.

COIL TABLE — All Coil Forms 1-Inch Diameter							
Range (Frequency)	Primary $L_1$	Tickler $L_2$	Dimensions (Inches)				
			A	B	C	D	E
2.5 Mc. to 5.5 Mc.	32 turns No. 24 d.c.c. close-wound. Connect jumper between Pins 5 and 3 as discussed in text.	9 turns No. 30 d.c.c. close-wound, spaced $\frac{1}{4}$ " from bottom of $L_1$ .	$\frac{1}{8}$	*	$1\frac{1}{8}$	$1\frac{1}{4}$	$1\frac{1}{6}$
5 Mc. to 11 Mc.	16 turns No. 24 d.c.c. spaced to occupy 1 inch. Tap 6 turns from start.	5 turns No. 24 d.c.c. close-wound, spaced $\frac{1}{8}$ " from bottom of $L_1$ .	$\frac{5}{16}$	$\frac{9}{16}$	$1\frac{1}{16}$	$1\frac{1}{8}$	$1\frac{1}{8}$
9.5 Mc. to 21.5 Mc.	8 turns No. 24 d.c.c. spaced to occupy 1 inch. Tap 5 turns from start.	3 turns No. 24 d.c.c. close-wound, spaced $\frac{1}{8}$ " from bottom of $L_1$ .	$\frac{3}{16}$	$\frac{3}{4}$	$1\frac{1}{16}$	$1\frac{1}{8}$	$1\frac{1}{8}$
19 Mc. to 32 Mc.	$3\frac{1}{2}$ turns No. 24 d.c.c. spaced to occupy $\frac{1}{8}$ inch. Tap $2\frac{1}{2}$ turns from start.	4 turns No. 24 d.c.c. close-wound, spaced $\frac{1}{8}$ " from bottom of $L_1$ .	$\frac{1}{4}$	$\frac{7}{8}$	$1\frac{1}{8}$	$1\frac{1}{4}$	$1\frac{1}{2}$

\* Tap not needed. Use jumper as discussed in text.

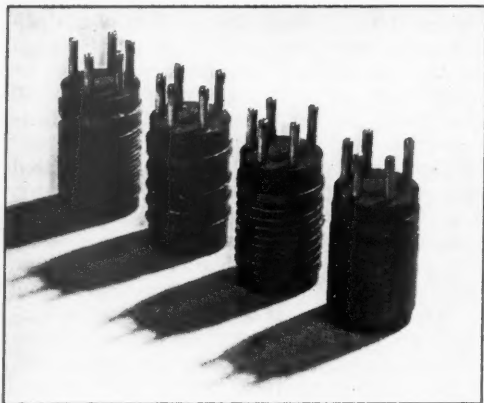


Fig. 9 — The four plug-in coils used with the code-practice receiver. Note that the holes through which the wires pass are staggered so that each hole is directly above the base pin to which the wire passing through that hole is to be connected. Winding details are contained in Fig. 8 and the coil table.

the tap and the coil. It is always best to preheat any soldered joint with the tip of the iron before solder is applied. In this way a better joint will be made, one that requires less solder and is much neater because less of the resin flux will be left behind.

The secondary or "tickler" winding,  $L_2$ , is put on next. In all cases, the tickler coils are close-wound, meaning that one turn goes right alongside of the next, separated only by the cotton insulation. They must all be wound in the same direction as the primary coils, spaced so that  $\frac{1}{8}$  inch separates them from the primary winding. The top of the tickler winding connects to Pin 2 in the coil form, the bottom to Pin 1.

A slightly-different procedure must be followed in winding the 10-meter coil. In this unit, the location of the tap is apt to be very critical, not that the set won't work if it is misplaced, but the range covered by the bandspread dial will be incorrect if it is not positioned correctly. The dimensions listed in the coil table should be followed closely, with the start of the primary winding of  $L_1$  being located adjacent to Pin 2, the end of  $L_2$  adjacent to Pin 4, and the hole for the tap adjacent to Pin 5. This does not mean that the connections to the pins are different in this coil. It merely means that the starting and ending places, and the tap location, differ. The wires are criss-crossed inside of the coil form to reach the proper pins, and should be spaced so that they do not touch one another.

When the coils have been wound and checked to make sure that they operate properly, they should be coated with coil dope, available in almost all radio stores, or with a thin covering of Duco household cement. The coating will prevent the turns from shifting around in handling, and will prevent moisture from impairing their per-

formance. Do not coat them until they have been checked however. This is discussed in the next section.

### Operating the Receiver

Connect the receiver to its power supply, the rod antenna to the antenna post, plug the headphones in the tip jacks on the chassis edge, and turn the antenna trimmer  $C_1$  to full capacitance (adjusting screw turned all the way in). Turn the volume control fully clockwise and set the band-set condenser at half capacitance. A few seconds after the power supply is turned on, a slight hum should be heard in the 'phones. Now turn the regeneration control slowly. If the detector stage is working properly, one point will be found at which a faint "pop" will be heard, followed by a gentle, low-pitched hiss. This hiss is the noise created by oscillation within the detector circuit. If it is not possible to cause the detector to oscillate, turn the power off, remove the coil, and push the turns on the tickler coil a little nearer the primary winding. Repeat the above procedure, listening carefully for the pop and the hiss. If a loud, high-pitched howl is heard, "explore" with the regeneration control to see if a point can be found at which the howl stops and the hiss becomes soft and low-pitched. If this point is found, but the detector cannot be made to stop oscillating, the tickler coil should be pushed a little farther away from the primary winding on the coil form. It should be possible, if the coils are wound as described above, to obtain the smooth control of oscillation that is necessary for proper operation of the receiver with little or no adjustment of turns, but if satisfactory operation cannot be obtained it may be necessary to rewind the tickler coil. Before this is done, however, check all connections against the circuit diagram to be sure that an error in wiring is not the cause of the trouble. If all wiring seems to be correct, inspect the coil to make sure that the tickler coil is wound in the same direction as the primary winding. If it is wound in the opposite direction, or if the connections in the base of the coil form are reversed, the detector cannot oscillate. This is because the windings will "buck" or oppose one another instead of serving their real purpose, that of feeding back enough voltage to the primary from the tickler to make the circuit oscillate.

Once the detector is known to be oscillating smoothly, turn the regeneration control to the point where the oscillation just stops, then move it back slowly to the point where it is just "on the edge" of oscillation. In this position, the receiver will be at its most sensitive point for reception of code signals and signals may be tuned in with the bandspread dial. With the detector oscillating, code signals will be heard as the familiar whistles, interrupted to form dots and

(Continued on page 112)



# A 40-Pound 14-Mc. Four-Element Beam

## Minimizing the Weight of the Rotary Array

BY KATASHI NOSE,\* KH6IJ, EX-K6CGK

• There are two approaches to rotary-beam construction. One is to build the thing heavy like a battleship, so that it can't fall apart. The other is to build it lean and light. KH6IJ belongs to the second school of thought, and describes a four-element 20-meter job that should be a pace-setter for quite some time.

EXPERIENCE with transmitting antennas ranging from 700-foot rhombics and "Vs" to 16-element barrages left the writer convinced that a close-spaced rotary beam is a hard antenna to beat on 14 Mc. Long-wire beams have the gains claimed for them, but a point frequently overlooked is that the increase in gain is usually more than offset by an increase in noise pick-up and image response, not to mention the greater possibility of harmonic radiation. Furthermore, the unidirectional feature of the close-spaced beam is a decided advantage when working DX through interference. The theory of close-spaced beams has been ably discussed in the past and need not be reviewed here. This article is written with emphasis on mechanical construction.

### Features

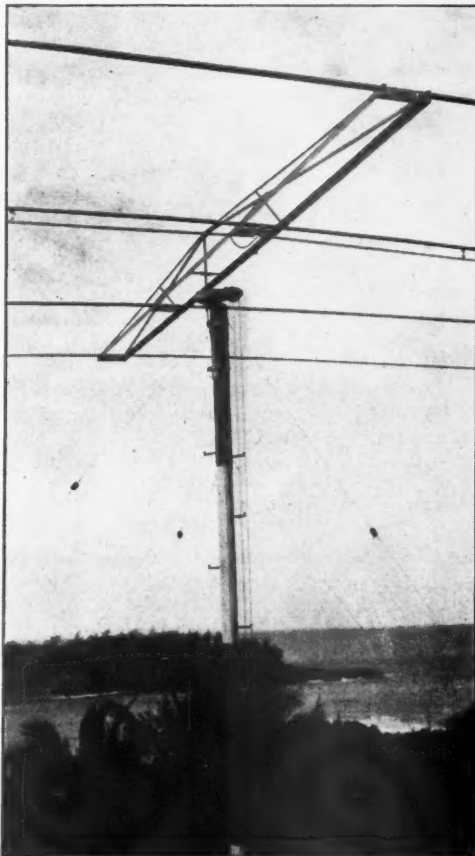
Most 14-Mc. beams are substantial affairs with a maze of braces, insulators and crossarms and of such a weight as to require an elaborate supporting structure. The beam to be described was designed with the thought that the fewer the pieces used for the boom the less would be the wind resistance and weight. That this was sound is attested by the fact that a full-size 20-meter rotary beam of four elements is supported by a 4-by 4-inch guyed pole and has withstood several mild tropical windstorms in the time it has been up. The salient features of this beam can be summarized as follows:

- 1) Light weight — entire assembly including rotator weighs 65 pounds. The beam itself weighs 40 pounds.
- 2) No insulators — "plumber's-delight" construction — no cracked insulators during and after installation.
- 3) No crossarms — elements are self-supporting.
- 4) Full size — not electrically or mechanically shortened.

- 5) All aluminum — fewer maintenance troubles.
- 6) Low wind resistance — a half-inch water pipe supports assembly.
- 7) Provision for adjustment — entire beam tilts toward pole.
- 8) Simple supporting structure — 40-foot 4 × 4 with spikes.
- 9) Coaxial feed with "T"-match — beam can rotate several times without twisting feedline.

### Materials

Surplus aluminum tubing and angles were used for the elements and boom. The total weight of aluminum utilized was forty pounds, as indicated



The four-element 14-Mc. beam at KH6IJ weighs only 40 pounds. It is fed by coaxial cable and is hand-rotated.

\* Chief Engineer, KTOH, Lihue, Kauai, T. H.

by the dealer's scale. Other than the pole, guys, spikes and rotator the following aluminum pieces were required:

- 4 — 1-inch diameter tubing, 12 feet long,  $\frac{1}{16}$ -inch wall
- 8 —  $\frac{1}{8}$ -inch diameter tubing, 12 feet long,  $\frac{1}{32}$ -inch wall — must fit snugly into 1-inch tubing
- 2 —  $1\frac{3}{4}$ -inch angle, 21 feet long
- 2 —  $\frac{3}{4}$ -inch angle, 21 feet long
- 4 —  $\frac{3}{4}$ -inch angle, 1 foot long
- 2 —  $\frac{1}{2}$ -inch diameter tubing, 6 feet long

Aluminum tubing and angle corresponding to the above sizes can possibly be bought from scrap dealers at reasonable prices, if not directly from the manufacturer. Ours are known as "ST" stock and came through surplus sales at a reasonable price. If the sections of the elements do not fit snugly, be sure to insert shims or make some other provision for a tight fit, since the appearance of the beam will be affected by sagging elements.

#### Supporting Structure

The supporting structure for this beam consists of a  $4 \times 4$  pole 34 feet long, with ten-foot extensions of  $2 \times 4$  bolted to two sides at the bottom, making the total length about 40 feet. The pole was first painted in appropriate colors, ours being marked with standard CAA colors of International Orange bands alternating with white bands, and it adds much to the appearance of the structure, as well as serving as a protective coating. The holes for the stepping spikes were then drilled 18 inches apart. Don't try to economize by making the steps greater than 18 inches. Two spikes were set at the same level at the top end of the pole, and serve as a convenient foot rest. Do not install the spikes until the pole is in the air.

Two sets of three guys are used, approximately 2 feet and 15 feet from the top. The advantages of erecting the pole against the side of the house and using the house as a support far outweigh any distortion in pattern. All published ar-

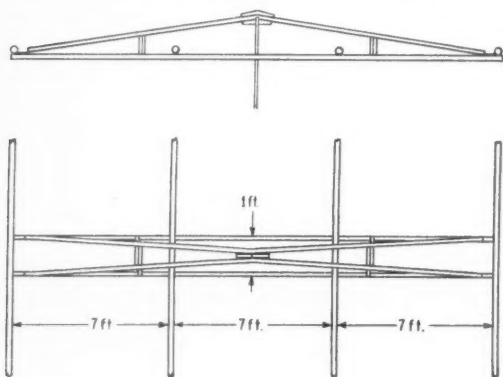


Fig. 1 — The general assembly of the boom of the four-element beam.

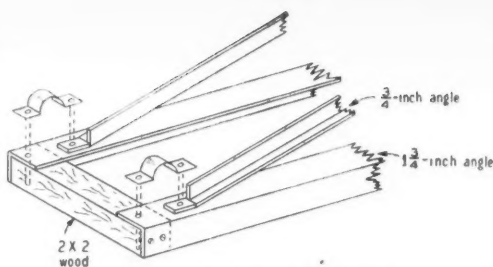


Fig. 2 — Detail of the boom ends.

ticles advocate a clear field for the antenna, but clear fields don't exist for the average city dweller, and thus the best handling of a bad situation dictated the use of the house as a support for the pole. The pole was laid parallel to the side of the house and hauled into an upright position with a rope tied near the center of gravity. It takes only a small amount of pull when hauled up from the roof in this manner, and one man can easily manage it. After the pole was in position, it was bolted to the eaves of the house with suitable angle-iron brackets.

#### The Boom

A small wooden model of the assembly was first constructed to test the design of the beam and boom. Torsional tests on this model determined the final placement of the braces and stays. The center of gravity of the whole assembly is lower than its supporting pivot, so that the entire beam can hang from one central pivot if necessary as when tilting the beam for adjustment. By using telescoping elements, the weight is evenly distributed, and no counterweights are necessary nor does the pivot have to be off-center. The two main braces are used as stays rather than as struts and help to keep the elements from whipping around. Past experience with wooden booms and crossarms showed that wood undergoes fatigue more than metal and results in unequal sagging of the elements.

Two  $1\frac{3}{4}$ -inch aluminum angles 21 feet long serve as the main members of the boom and are spaced one foot apart as shown in Fig. 1. The elements are spaced 7 feet apart. Wooden spacers of  $2 \times 2$  are placed at the ends of the boom and screwed on with brass screws. These spacers are also placed under each element where it crosses the boom. Conceivably these spacers are unnecessary if the elements are bolted to the boom, but ours were held down with aluminum straps since we were loath to drill holes in the elements.

The two  $\frac{3}{4}$ -inch aluminum angles 21 feet long were bent in a vise at the exact center and placed in position as shown in Fig. 2.

The cross braces shown in Fig. 3 were put into position at the very last, after the beam was hung in position on the central pivot, since they offer a means for truing up minor sag in the elements.

### The Central Pivot

The central pivot consists of an odd-shaped structure made from  $\frac{3}{4}$ -inch angle iron and  $\frac{1}{2}$ -inch pipe, as shown in Fig. 4. It has to be brazed. The crossbar rest is made separate from the boom and central pivot, and affords a means for tilting the beam when unbolted from these structures. The  $\frac{1}{2}$ -inch pipe is drilled for the coax line that is fed through this pipe. The pinion gear on the  $\frac{1}{2}$ -inch pipe should be brazed on. Several attempts to hold the beam in place with setscrews ended up in broken screws and twisted coaxial cable.

### The Rotator

A washing-machine gear train is well suited for this type of beam. We found something similar but much lighter in a discarded forge blower. It was fitted with a  $\frac{1}{2}$ -inch pipe which serves as the central pivot. The gear train ends up in a "V"-pulley, and the beam is easily rotated by a system of ropes and pulleys that ends up in an automobile steering wheel at the operating position. A plumb bob attached to the shaft of the steering wheel serves as a direction indicator.

### The Elements

Since no crossarms are used to support the elements, the elements should not be broken in the center for tuning stubs or feedline. Tuning is done by telescoping the end sections into the larger center section. The elements are of conventional length. A "T"-match is about the only

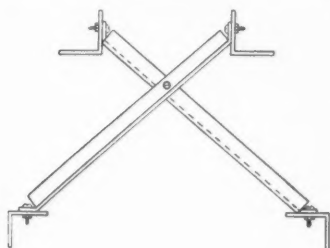


Fig. 3—The boom is cross-braced at two points, about  $6\frac{1}{2}$  feet in from the ends.

feasible system in this case. Lucite strips are used as insulators for the "T," which consists of  $\frac{1}{2}$ -inch aluminum tubing about 6 or 7 feet long. The best match resulted where the matching sections were 66 inches each side of center, although this length will probably vary with the installation. The rods are held in place with 1-inch-wide aluminum straps. Our material came from aluminum-based recording blanks with the Vinylite peeled off by pouring on hot water. These straps also hold the elements to the boom.

### The Assembly

Assemble the central pivot and the "H"-shaped piece, and then screw the two main boom pieces to the "H." Four wooden spacers of  $2 \times 2$

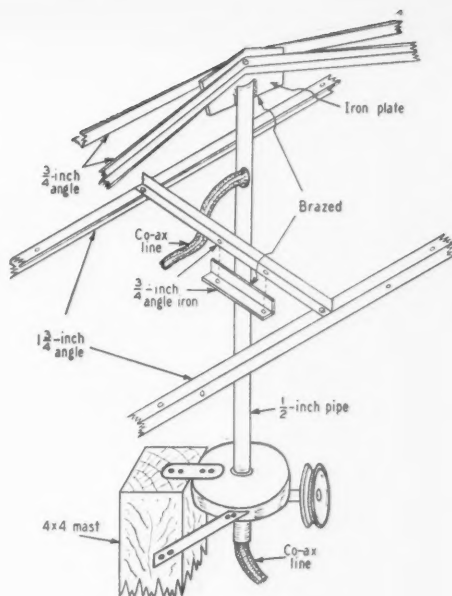


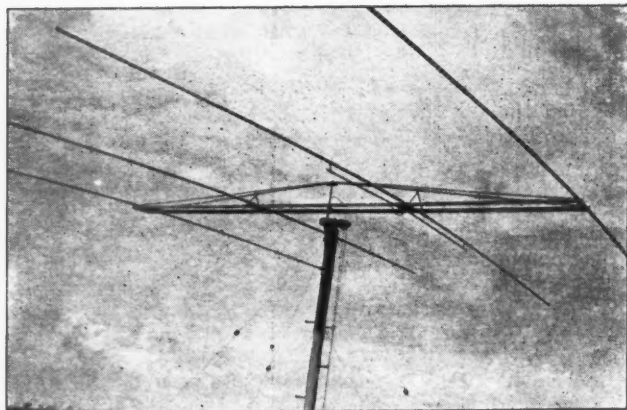
Fig. 4—Central-pivot details.

are then screwed into place. The two mainstays are then put into place on the pivot, and the ends are bolted to the boom and wooden spacers, after truing up the corners for equal sag. Be sure to get the corners of equal height, else the elements will not all be in the same plane. It is a good idea to make the holes for the bolts only after the corners have been adjusted. The holes should be just large enough to clear the bolts and no more, as any play in the bolts will be reflected in sagging elements. The elements should then be strapped into position. The four cross braces are then put into position as indicated in the drawing. By positioning these braces minor corrections in the sag of the elements can be made.

### Tuning

A temporary pole was erected on the rooftop for the tuning process. Lacking suitable r.f. indicating devices, the station receiver was put to use. The S-meter was removed and a pair of wires extended to the rooftop and the meter placed in a position where it could be observed during the tuning process.

A signal generator, the kind used by servicemen to align sets, was placed about 500 feet away and tuned to the desired frequency. The antenna used on the signal generator was adjusted to produce a suitable reading on the S-meter (preferably full scale with the beam pointed in the direction of the source). The receiver was run wide open and the adjusting of signal strength was done with the generator. The elements were adjusted for minimum signal pick-up with the rear of the beam



A side view of the beam at KH6IJ, showing the construction of the boom.

toward the signal source. Methods of tuning have been covered in the past, and the reader is referred to any one of the excellent articles on this subject. Serious detuning of the elements resulted each time the element was held in the hands for telescoping, resulting in confusion and annoyance. This body capacity was overcome by tying a rope to the outer section and pulling toward the center, resulting in a beautiful dip of the S-meter every time the correct point was passed. It was found that tuning for minimum signal in the back coincided very nearly with maximum gain to the front.

#### Mounting the Assembly

The rooftop conveniently served as a platform to hoist the beam into position. The beam was given a coat of aluminum paint to prevent corrosion. If possible, the inside of the elements should be painted by pouring paint into them while one end is plugged. It was found better to hoist the completely-assembled beam, rotator, and all, instead of beam and rotator separately. A rope was tied near the center of the boom, and the beam hoisted into position with assistance from the rooftop.

Since the structure is light, conceivably the complete beam could be fastened to the supporting  $4 \times 4$  and the whole structure, pole, beam and rotator be hoisted upright by bracing the bottom against the side of the house and pulling from the rooftop. In our case this was not feasible because of the surrounding trees and foliage.

#### Results

Europe has been a difficult continent to work from Hawaii, and about the only way one can compete with the W stations is to point a beam north to cut out the interference from Ws. Front-to-back ratios have been remarkable with this beam, although no quantitative measurements have been taken. A 400-foot long wire in the favored direction was used as a comparison antenna. Signals inaudible or unreadable on the

long wire are perfectly readable on the beam. To be honest, there have been no "S9-plus" reports from European stations, but the fact that Europeans have been worked night after night through all sorts of conditions, in competition with W6 stations, speaks well for the beam. One hundred and sixty European stations have been contacted over a period of two months. The final test of a beam is its performance over a period of time, and this one has outperformed all of its predecessors on 20 meters.

#### Silent Keys

It is with deep regret that we record the passing of these amateurs:

W1AJW, George R. Cogswell, Belmont, Mass.

W1KKS ("BM" of W1AW), William H. Matchett, Manchester, Conn.

W2KIL, Michael Hertz, jr., Elizabeth, N. J.

W2RCX, George C. Robinson, Batavia, N. Y.

W5GFH, Frank Lahman, Stillwater, Okla.

W5KMD, D. D. Hall, jr., Shreveport, La.

W7DDU, Arthur Perry, Boise, Idaho

W7DXR, Glynn H. Gau, Seattle, Wash.

W8CCO, John P. Fagerholm, Cleveland Heights, Ohio

W8SSG, Walter J. Coffing, Comstock, Mich.

W8URL, John P. Gruver, Gardena, Calif.

W9BW, Joseph Z. Winder, Richmond, Ind.

W0IFN, Arthur J. Lantz, Boone, Iowa

W0TLL, Richard W. Sowden, Burlington, Iowa

W0ZBU, L. L. Simmons, Platte, S. D.

Ex-FY8AA/FABAA, A. Quintrie, Cayenne

VE1JV, T. G. MacLean, Hopewell, N. S.

VE3ATQ, Ray B. House, Crystal Beach, Ontario



# Happenings of the Month

## ATLANTIC CITY NOTES

The Final Acts of the Atlantic City conferences were signed at a closing ceremony there on October 2nd. There were no holdouts, no reservations of significant effect on the allocation table. Thereupon, after twenty weeks of arduous sessions, the conferences dissolved and we closed the ARRL ACy office and came home.

The 7-Mc. band was threatened with trouble up to the end of the conferences. In middle September, at the final meeting of the allocation committee, India, backed by half a dozen other Asiatic countries, unsuccessfully endeavored to increase the broadcasting allocation in this band in that region. A few days later, at the first plenary adoption of the table, there was more of the same, resulting in an amendment of the provisions for this band in Region 3 into the form in which we reported them last month. On September 26th, in the closing days of the High-Frequency Broadcasting Conference, there was a further rumpus about tropical broadcasting, with the possibility existing for a while that the frequency table would be brought back into the radio conference and reopened to reexamine the provisions for the 7-Mc. band. Eventually, however, all of these difficulties were compromised and the signing occurred without deviation from our report of last month.

In our last issue we mentioned that the final documents of the other conferences would gross as large as several issues of *QST*. We were considerably too modest. It is now estimated that the English-French texts will aggregate 1100 printed pages, in a book incorporating the treaty or convention, the radio regulations and all of the appendixes, annexes, protocols, resolutions and recommendations—the Final Acts that were signed by the authorized delegates. These documents are now being printed for public distribution, to be ready about December 1st. As a service to all telecommunication interests in the western hemisphere, the League has agreed to a request

of the general secretariat of the International Telecommunication Union that it act as the selling and distributing agency for the countries of the Americas, on a nonprofit basis. All distribution in the American region to governments, companies and individuals will be via the League, a service that we are rendering to save the inconvenience and delay that would otherwise be involved in ordering the copies from Switzerland. The price, set by the ITU secretariat in accordance with regulations, is \$1.50, postpaid, to individuals and private enterprises, and with a special price of \$1.20 to governments and government agencies. If you have a spare buck and a half we think you would find it interesting to see how the treaty reads, to perceive how these things are set up and to take a look at the detailed provisions governing the manifold radio services of the world.

## F.C.C. NOTES

ARRL's request of FCC to authorize mobile operation on all amateur frequencies was put on ice during the ACy conference, where some nations expressed objection to any amateur operation outside the limits of the licensing country. ACy being over now, the question is again under study. . . . Meanwhile FCC of its own volition has given public notice of proposed rule-making to amend §12.63 of our rules as it relates to remote control. The proposed text explicitly states what is required but offers no changes in principle from the present provisions and seems satisfactory to us. When adopted and announced, *QST* will present the full text. . . . The so-called television hearing, also of course involving the fixed and mobile and amateur services, was postponed until November 17th. There should be something to report on it in our next issue.

FCC Chairman Charles R. Denny, jr., who distinguished himself as the chairman of all three ACy conferences (as well as being chairman of the American delegation), resigned from FCC as of October 31st to become the general counsel of a broadcasting chain. Commissioner Jett goes to Geneva the first of the year to be the U. S. representative for the first six months of the life of PFB. Meanwhile Commissioner Webster goes to London as the U. S. member of a coordinating committee concerned with safety of life at sea and in the air. It is expected that Captain Paul Miles, new chairman of IFRB, will be succeeded as chief of FCC's Frequency Service-Allocation Division by his assistant, Albert McIntosh, W3ZM.

## ARE YOU LICENSED?

• When joining the League or renewing your membership, it is important that you show whether you have an amateur license, either station or operator. Please state your call and/or the class of operator license held, that we may verify your classification.

# Winds, Waves and Snakes

## *A Report of Amateur Participation in the September 1947 Florida Peninsula-Gulf Coast Hurricane*

BY ALBERT HAYES, \* WIIIN, EX-W3LVY

**W**EATHER-WISE as the inhabitants of Southern Florida are, the hurricane which swept out of the South Atlantic and screamed its way across the peninsula from Palm Beach to Fort Myers was neither a surprise nor a shock. For nearly a week before the morning of September 17th the Weather Bureau had been watching the storm as it veered crazily toward W4-land from its birthplace in the tropics. Preparations by national and local relief agencies were well laid, and the amateurs in the Southeastern area formulated their plans in great detail.

The Coast Guard Auxiliary Shore Net, under the leadership of W4ES, was alerted when it became apparent that the storm would definitely hit Florida. Operating on its regular frequency of 3855 kc., the net, comprising W4s AFO, BB, DQW, EHZ, ES, FUM, FWZ, GJI, HGO, ISR and QR, was well at work many hours before the storm struck. W4GJI, West Palm Beach, did much valuable work prior to the blow in warning the residents of the Everglades area of the impending storm and informed them of the schedules of special trains for evacuees as well as arranging with the Army for refugee quarters in barracks at Morrison Field.

Immediately after the storm hit, the Florida Emergency 'Phone Net, which had been alerted on the day before by W4JQ, SEC for Eastern Florida, was placed under the control of W4ES, and this net, operating on 3910 kc., together with the CGASN, provided the entire state with 3.85-Mc. emergency coverage. Stations participating as members of FEPN included W4s ADB, BI, BOL, CPG, CYU, DPD, DRD, DU, DXI, DZN, ETB, FCA, FCL, FGQ, FJU, FRP, GCD, GEJ, GGJ, GUJ, GY, GZY, HDC, IJC,

IMJ, INO, IQV, IVQ, IVX, JKI, JQ, KKV, KOZ, KRA, NKI, NN, PB, WS and NR.

Among the agencies served by the combined 'phone nets were the Red Cross, Atlantic Coast Line R.R., CAA, Eastern Air Lines, Florida Health Department, Florida East Coast R.R., FCC, U. S. Engineers, U. S. Weather Bureau, Western Union, AP and UP.

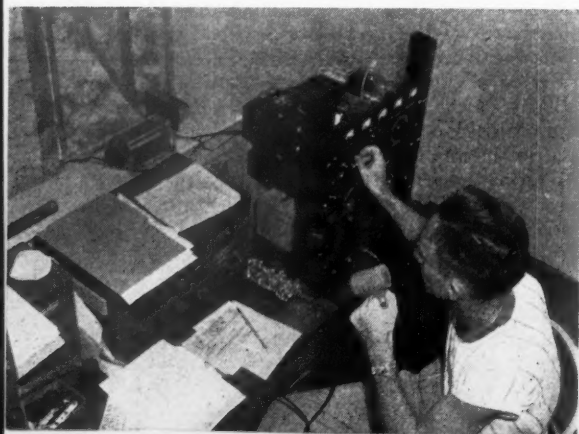
W4AFO, Punta Gorda, with W4KIO acting as second operator, was on the air for more than 62 hours with each of the operators getting less than 4 hours' total sleep during that period. A particularly strong gust took a large part of the roof of the station with it, and operations continued during the remainder of the emergency with a tarpaulin protecting the radio equipment from the torrential rains that poured through the roof.

W4IEZ took a battery portable to Boca Grande Island just before the storm and operated for two days under extreme difficulties which included a 125-m.p.h. wind. After the storm had abated, a resident asked why he had not used the "radio station," and, upon investigation, IEZ found a stormproof building containing two 500-watt transmitters fed by an underground cable from the powerhouse next door! One of the transmitters was set up on the emergency frequency and needed only a crystal to be put into operation.

W4HDX and W4HCM operated W4HDX/4 (14,294 kc.) on emergency power from the WJNO transmitter building at West Palm Beach for the duration of the communications emergency.

The Florida C.W. Net was directed by W4GEE who set up on emergency power in the AACS building at Tampa when it became apparent that his home station would lose its commercial power when the storm increased in intensity. W4FIV and W4LLM aided in setting up the big AACS transmitter on 7-Mc. and assisted W4GEE as relief operators until the communications emergency was considered to have ended. The c.w. net operated on 7180 kc. and included W4s AAR, AFZ, AKV, AYW, BO, BQO, BYD, CG, DQW, EEW, FCF, FGC, FIV, FPK, FQZ, FWZ, GIV, GU, GXL, HAD, HXF, IMI, IML, IQV, IRL, JAV, JBM, JPY, JYG, KTH, LAP,

\* National Emergency Coordinator, ARRL.



Warren Spencer, W4HDX, operating portable in the WJNO Building in West Palm Beach where emergency power was available throughout the hurricane.

**QST for**

W4GEE/4 was set up at the AACS base in Tampa, Fla., and acted as NCS for the Florida C.W. Net for the duration of the Florida emergency. The operators shown are "Wally" Wallace, W4FIV, and Dick Heuer, W4GEE.

LCZ, LJB, MIW, PL, SQ, TL; K4NR; W2BO; W3EIS and W3USA.

The activities of the c.w. net were divided between the handling of weather information for CAA, Red Cross and the Tampa AACS Base, and the handling of much personal-welfare traffic.

Nineteen hours after its first blows had been felt along the eastern shore of the Florida peninsula the hurricane disappeared into the Gulf of Mexico. Its path, from Miami and Palm Beach to Fort Myers, was littered with millions of dollars of material damage, but, fortunately, no lives had been lost. Floridians began the long task of repairing the physical damage left in the wake of the big wind, and the amateurs who had labored so mightily for over two days pulled the switches and began a well-deserved rest. The nation slept in peace.

#### Mississippi & Louisiana

The Old Spanish Trail, a group of communities extending along the Gulf Coast from Pascagoula, Miss., to Bay St. Louis, Miss., slept peacefully as the storm wandered across the Gulf of Mexico. Perhaps the disturbances which brought moderate rains and gale winds during the night should have warned the unsuspecting sleepers that something unusual was afoot, but the night passed slowly, and it was not until dawn on the 19th that the full impact of the runaway monster was felt along the Gulf Coast. In Pascagoula trees were uprooted and shop windows blown in. At Biloxi most of the waterfront, studded with million-dollar seaside mansions, was torn up by the fury of the winds. The famous "beach road" was virtually wiped out. Large blocks of concrete from the sea wall were ripped from their resting places of years and were sent hurtling across the beach road to batter hundreds of seaside homes into piles of rubble. At Gulfport, one of the main industrial and pleasure ports of the region, dozens of piers were lashed to bits by the fury of the immense waves borne by the wind. Thousands of 12-by-12 piling members were hurled into dozens of beach cottages which had made the area a summer playground, reducing them to



firewood in a few short minutes. Mammoth oil-storage tanks for the fueling of the great coast-wise steamers which call at Gulfport were torn from their mountings and sent hurtling along the coast, adding their destructive weight to the force of the winds and the storm-tossed waves. The famous Yacht Club literally disappeared.

The towns of Pass Christian, 12 miles west of Gulfport, and Bay St. Louis, 15 miles west of Gulfport, situated on opposite sides of the mouth of Saint Louis Bay, were inundated by the high waters which accompanied the winds, and hundreds of poisonous water moccasins, washed ashore from the many off-shore islands, added to the misery of the populace. All transportation and communication facilities through the area were demolished in less time than it takes to tell.

High winds in New Orleans, fifty miles to the West, over which the "eye" of the storm passed, brought considerable superficial damage to that city, and the high waters of Lake Ponchartrain inundated several districts and temporarily paralyzed communications throughout New Orleans Parish.

Late in the evening of Thursday the 18th, units of the Mississippi National Guard were ordered to Gulfport by the Governor. The communications forces under the leadership of Major Ernest L. Smith, ex-W5BPO, swung into action on the job of restoring communications between the coastal area from Biloxi to Bay St. Louis and the outside world. Norman B. Feehan, W5JHS, Gulfport, and Bradshaw, W5NHH, Hattiesburg, Miss., acting as EC and Assistant EC respectively, contacted Major Smith and arranged a program of cooperation between amateurs and the military forces.

Under the command of Lt. Cmdr. L. S. Cotten, USNR, the Naval Reserve division located at

The crew at W5JHS/5, Gulfport, showing (l. to r.) W5KZD, W5GXO, W5JHS, Major Smith, W5NHH, W5JYK, Sgt. Lewis, AACS, and W5HXV. Set up in the ballroom of the Great Southern Hotel, W5JHS/5 acted as a message center for the several Gulfport stations.



December 1947



W5ANP (right) passes an urgent message to the jr. op from W5JHS. W5ANP/5, Mississippi City, ran on emergency power throughout the emergency and provided a reliable 3920-kc. outlet for the stricken Gulf Coast.

Gulfport was also called to active duty on the 18th. Commander Cotten and EC Feehan arranged to place several gasoline-powered generators at key stations that might be of maximum value in the event of failure of the commercial power lines.

W5JHS/5 was set up in the Great Southern Hotel at Gulfport where a private generating plant had been put into service to replace the missing commercial power. Operations on 3920 kc. were maintained for the next 16 hours with W5JHS and W5NHH sharing the operating burden.

W5ANP, Mississippi City, three miles east of Gulfport, using an emergency gasoline-driven generator supplied by the Mississippi National Guard, operated on 3920 kc. with a high-powered transmitter to assist the efforts of the 100-watter at W5JHS, and handled a large number of urgent messages during the early stages of the emergency. This station was kept on the air continuously from the 18th through the 23rd with W5MJL, W5HRX and W5GXO serving as relief operators. About 100 third-party messages were handled by the W5ANP crew during that period.

During the afternoon of September 20th, W5JHS requested that W5KTE, Louisiana SEC,

supply, if possible, 7-Mc. coils for the HT-9 transmitter in use at W5JHS together with relief operators for the Gulf Coast group. This was arranged by W5KTE. Through the cooperation of the Louisiana National Guard, several C-47 airplanes made flights from New Orleans to Gulfport bearing relief operators, new crystals, coils, and two 1500-watt gasoline-driven generators, as well as a number of receivers and low-power 'phone-c.w. transmitters. Among the operators who volunteered to be flown into the



James N. Watson (left) and M. W. Kirkpatrick, W5KYC, operating W5KYC/5 which was rushed from the home location in Hattiesburg, Miss., to one of the hardest-hit locations on the Gulf Coast — Bay St. Louis. Operating from a gasoline-powered generator this 3.85-Mc. 'phone station was in continuous operation from September 20th through September 25th.

disaster area were W5s GXO, HXV, JYK, KTG, KTK, KUW, KZD, LDH and NOM.

The W5JHS transmitter was speedily put on 7151 kc. With W5HXV, W5JYK, W5KUW and W5KZD at the key, 24-hour high-speed circuits were maintained with the outside world, W5KTE and W4PL taking the majority of the c.w. traffic. Over 500 messages were handled by this station before the communications emergency at Gulfport was declared over by EC Feehan.

In the meantime W5KYC and Jim Watson, both of Hattiesburg, Miss., had made their way

The emergency set-up at Pass Christian, showing (l. to r.) Dorothy Collins, W5KTK and W5NOM. Operating as a relay station between Gulfport and Bay St. Louis, much urgent traffic was handled on 3920 kc.



**QST for**



**W5DLA/5**, the Gulfport 'phone outlet, with **W5DLA** himself at the controls, Mrs. E. J. Pollock standing by, and Charlie Lawshe copying traffic.

to Bay St. Louis via the "back road" (some 40 miles longer than the usual route) and had set up **W5KYC/5** in the Reed Hotel there. Operating emergency power on 3920 kc., the operators stayed on the air for nearly four days without appreciable sleep. When relief operators arrived in Gulfport **W5KTG/5** was dispatched to Bay St. Louis with a 7-Mc. c.w. transmitter, a receiver, and one of the 1500-watt gasoline generators in order to move traffic from Bay St. Louis to **W5JHS/5**-Gulfport and **W5KTE**-New Orleans on c.w. when propagation conditions were such that the distance could not be handled by the 3920-kc. 'phone stations. This c.w. station operated under the call **W5KTG/5** and moved several hundred messages of a priority nature between the stricken area and New Orleans.

**W5KTG/5** was operated at the same location as **W5KYC/5**, therefore good liaison was maintained at that point between the 'phone and c.w. nets. Jim Watson acted as technician for the combined stations at Bay St. Louis and was largely instrumental in keeping the stations on the air.

On the afternoon of the 21st, when power was restored to a few downtown locations in Gulfport, **W5DLA** moved his 'phone station to the electrical-appliance store of M. M. Broadus, several blocks from **W5JHS/5**. Using the 3920-kc. crystal from the transmitter at **W5JHS/5**, this set-up kept Gulfport in the 'phone net which by that time was taking shape with **W5ANP**, **W5HAV**, **W5HHT** and **W5HKJ** participating. **W5DLA**, who had been relief operator for two days and one night at **W5ANP**, was assisted in keeping his station on the air by **W5GXO**, **W5JSH** and **W5MAA**.

When it became apparent that the 'phone link on 3920 kc. from **W5KYC/5** in Bay St. Louis to **W5DLA/5** in Gulfport could not handle traffic continuously because of propagation conditions, an additional station, **W5KTK/5**, was set up at Pass Christian with **W5KTK** and **W5NOM** sharing the operating burden. Since Pass Christian is nearly midway between **W5KYC/5** and **W5DLA/5**, **W5KTK/5** acted mainly in a relay capacity, remaining in operation until the end of the emergency on the 23rd.

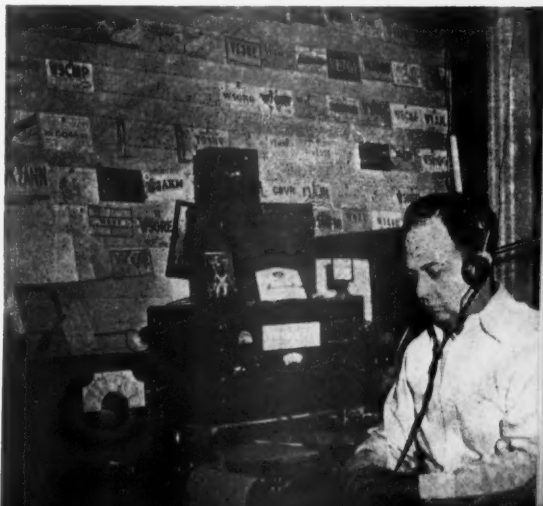
Jim Coleman, **W5KTE**, ARRL SEC of Louisiana, who held down the c.w. end of things in New Orleans with the help of the New Orleans gang. With **W5HHT** keeping the 'phone channels open between New Orleans and the Gulf Coast and Jim's crew on c.w., the traffic moved thick and fast.



The Gulf Coast Emergency Net, as the combined 'phone and c.w. net including **W5s ANP**, **DLA**, **GIA**, **HAV**, **HHT**, **HKJ**, **JHS**, **KTE**, **KTG**, **KTK**, **KYC** and **LN** came to be known, operated as a smoothly-coordinated whole with **W5DLA/5** acting as NCS of the 'phone section and **W5KTE** coordinating the on-the-air activity of the c.w. group. Liaison between the 'phone and c.w. sections was maintained at several points, and special credit is due EC Feehan for the establishment of the procedure whereby messengers between **W5DLA/5** and **W5JHS/5** distributed outgoing traffic between the two subdivisions of the net so as to operate each mode of emission at its maximum efficiency. Many hundreds of messages were handled for the National Guard, AP, UP, INS, Red Cross, local broadcast stations, and others.

Regional Manager Joe McKinney of FCC was present at Bay St. Louis during the greater part of the communications emergency and was directly in touch with most of the stations in the GCEN.

In New Orleans (partially inundated by flood waters but otherwise not in particularly dire straits) a 28-Mc. 'phone net, operating on a combination fixed-mobile basis and including **W5s AVO**, **EDY**, **FVR**, **GXO**, **HRD**, **IXL**, **JFZ**, **KCH**, **KJD**, **KTG**, **LJD**, **LVG** and **NNH**, and **W4s FDR** and **LUY**, provided around-town communication while the storm was in progress. Members also aided in the evacuation



**December 1947**



Donald McClennon, W3EIS, Beltsville, Md., ARRL Emergency Coördinator, was designated by National Headquarters of American Red Cross as official c.w. contact between ARC headquarters in Washington and the devastated areas.

of persons from the flooded parts of the city. James Coleman, W5KTE, Louisiana SEC, operated continuously on both 3920 kc. and 7150 kc. from the 18th through the 23rd. With W5AVO, W5ISF, W5IXP, W5KXU and W5NR as reliefs, W5KTE handled more than 1000 messages, including 250 priority messages for relief agencies.

W5YU, the station of the Tulane University Radio Club, operating 14- and 3.85-Mc. 'phone, was manned by W5GLH, W5GWZ, W5HET, W5KXP and W5KTR, and was instrumental in supplying communication with the outside world during the early hours when it appeared New Orleans might be without wire facilities.

Of the New Orleans gang, the following also are known to have assisted in the communications task presented by the hurricane: W5s BPL, BUK, EBV, FMO, GRE, HHT, HOU, ISF, JRI, JWI, KCH, KOU, KTF, KTZ, KUG, KXP, LLJ, MXJ, QJ and RN.

In Atlanta W4DXI, W4HDC and W4KV, acting as a team, formed a message center which assisted in getting traffic into and out of both of the disaster-struck areas in coöperation with the Red Cross Wire System Atlanta terminal. Mr. R. S. Jones, radio chief of the Southeastern Division, ARC, kept in constant touch with DXI, HDC, and KV, and has congratulated them for the superb job they did under very difficult circumstances.

In Washington W3ECP and W3EIS were designated as terminal points for official Red Cross traffic. Both ECP and EIS coöperated closely with ARC officials and it is reported that their participation was instrumental in assisting that agency.

The following nets are known to have contributed greatly in the moving of traffic into and out of the disaster areas: Cracker Emergency Net, Rebel Net, Delta 75 Net, Hit & Bounce Net, Trunk Line C, STEN and Trunk Line AP.

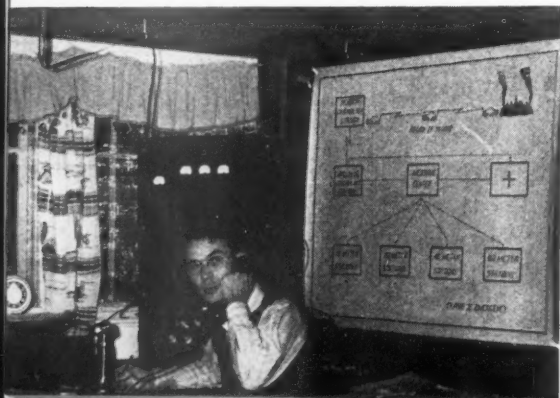
FCC and its representatives coöperated very closely with the amateurs during this double disaster and issued special orders clearing the emergency frequencies used by the nets in the stricken areas whenever it was apparent that operations were being hindered by QRM from stations outside the emergency zones. During the course of the promulgation of the several orders the following stations were designated as monitoring-observing stations, and their work in keeping the frequencies clear of casual communicators was appreciated by the operators in the emergency areas: W1AW, W2BO, W2HX, W3ECP, W3EIS, W3UA, W4JQ, W4BOL, W4AZT, W4ASR, W4BYF, W4DQW, W4FIV, W4GEE, W4QT, W4FWZ, W4GXL, W4HAD, W4IQV, W4JAV, W4PL, W4MIW, K4NR, W4KAO, W5IGW, W5CEW, W5LN, W5JPJ, W5DAS, W5IYJ, W5HIF, W5HQR, W5HXL, W5AHT, W5JIC and W5VT.

The double emergency was declared by FCC to have ended at midnight on the 26th, and the emergency stations were secured to enable their many operators to catch up on their sleep. This storm had shown more plainly than any previous disaster the importance of advance planning and the value of coördination between different nets operating on different frequencies.

It would take an entire issue of *QST* to tell the whole story of amateur participation in the September 1947 hurricane, even if it were possible to contact individually each of the operators who contributed to successful handling of the Herculean problem which was presented. Undoubtedly there are operators who have played a part equally as important as some of those mentioned above, but who may go unheralded because of the limitations imposed by the vast scope of the effort.

(Continued on page 118)

W4HDC, Atlanta, who operated a message center for the Red Cross in coöperation with W4DXI and W4KV. Several hundred messages flowed between the storm areas and the Red Cross wire terminal through this group.



**QST for**

# I.A.R.U. News



## CHINA

The Headquarters staff had the pleasure of being visited recently by Mr. K. T. Chu, acting president and managing secretary of the *Chinese Amateur Radio League*. From Mr. Chu, who attended the Atlantic City conferences, we learned many interesting things about C.A.R.L. and Chinese amateurs.

The C.A.R.L. headquarters station, located in Nanking, consists of two transmitters, one on 7 Mc. and the other on 14 Mc. Each has a power input of 500 watts and is capable of being operated on either c.w. or 'phone. No definite hours are set aside for general amateur operation, but the station — now XU0A but expected eventually to change to B0A to conform to the Atlantic City regulations — is generally on the air every evening. Bulletins of general interest to Chinese amateurs are transmitted by voice, using Mandarin, the official Chinese language, each Friday at 8 p.m. on the 14-Mc. band.

C.A.R.L. has thirty-six branches at various locations throughout China, thirteen of which are student-branches at universities which offer courses in engineering. An annual convention is held on May 5th, at which members set up committees to receive and act upon proposals for the government of C.A.R.L. during the coming year.

The *League* has been designated by the Minister of Communications as the licensing authority for Chinese amateurs. Three classes of licenses, ranging from receiving-only to full-fledged transmitting permits, are issued to members, who must be Chinese nationals.

## PANAMA

The radio amateurs of the Republic of Panama have just formed an association, the *Liga Panamena de Radio Aficionados*. The new organization, chartered by the Panamanian government September 16, 1947, has indicated an interest in becoming a member of the Union.

## GREAT BRITAIN

The *Radio Society of Great Britain* has announced that a new certificate — to be known as the Empire DX certificate — is to be issued by the society to those who submit evidence of having established two-way contact on 14 Mc. or two-way contact on bands other than 14 Mc. with amateur stations situated in 50 Empire countries or call areas.

The Empire DX certificate will be issued free to members of R.S.G.B. Nonmembers are required to pay a fee of 2/6 or an equivalent amount in other currency. Claimants must certify that maximum power input granted by their licenses was not exceeded in effecting the contacts upon which their claim is based. Each application for the certificate must be accompanied by documentary proof in the form of letters or cards saying that a two-way communication has taken place. Each card or other proof must show a minimum readability report of R3 and minimum tone report of T8. All applications should be sent by registered mail to General Secretary, Radio Society of Great Britain, New Ruskin House, 28 Little Russell St., London, W.C. 1.

A mimeographed list of countries and call areas for the Empire DX certificate will be supplied upon request to A.R.R.L. headquarters.

## GUATEMALA

Radio amateurs of Guatemala have recently formed the *Club de Radio Aficionados de Guatemala*. Mr. Manuel Gomez de Leon, TG9MG, was elected first president of the new association and has indicated that C.R.A.G. is interested in becoming affiliated with the Union.

## CZECHOSLOVAKIA

The effects of the war and subsequent readjustments have made it necessary for practically all Czechoslovakian associations to form subsidiary or separate organizations for Slovaks. In line with this general practice, the Slovakian members of C.A.V. have formed the *Spolok Slovenskych Kratkovlnnych Amaterov*. The S.S.-K.A., a subsidiary of C.A.V., is represented in international affairs by three members on a nine-member committee, six of whom are Czechs. This committee determines the international policies of C.A.V.

## NETHERLANDS INDIES

According to information received from Mr. A. te Riet, PK1RI, secretary-treasurer of the newly-reorganized *Nederlandsch-Indische Vereniging voor Internationaal Radio-Amateurisme*, PK amateurs have not yet been given official permission to return to the air. He reports that many former members of N.I.V.I.R.A. lost their lives in Japanese prisons and that all lost their

(Continued on page 118)

# Keying the Tetrode Amplifier

## Reducing Clicks by High-Level Keying

BY BYRON O. BALLOU,\* W6BET

OVER the years it has become too common in some circles to tolerate moderate clicks, especially from near-by transmitters, on the basis that some clicks are "inevitable." That these clicks are not necessary is apparent to those who have eliminated them, and a circuit will be described that has worked well for a number of high-powered stations located within a radius of a few miles. If there is no frequency shift (chirp) with keying, and if the entire transmitter is free from regeneration and parasitic oscillations, it can be shown "on the scope" that the key clicks heard, even from near-by transmitters, are caused by too short a rise or decay time in the transmitter output. With the circuit to be described, the highest-speed hand keying can be perfectly clean-cut and devoid of clicks.

The principle involved is that of discouraging the keyed stage and what follows it from behaving like pulse-shaping or "sharpening" amplifiers. The common practice in transmitters keyed back

• When a gang of c.w. men work together during the day, and all live within a few miles of each other, the fellow who shows up with key clicks doesn't stand much of a chance. In this article W6BET describes a keying system that has done the trick for him and the other stations near-by.

enough fixed bias to keep the plates from burning up with no excitation will help some, but it's rough on the tubes and wasteful of power. Since each stage with cut-off fixed bias that follows the keyed stage adds clicks, one obvious thing to do is to move the key over as close as possible to the final, and then go to work on the click problem.

In a tetrode r.f. amplifier, the flow of plate current is dependent not only on control-grid bias and excitation but also the voltage applied to the screen grid. By keying the excitation and screen

voltage simultaneously, it is possible to eliminate fixed bias on the tetrode amplifier stage. One system of this sort, using a separate small tube to control the screen voltage, has been described.<sup>1</sup>

Another system is shown in Fig. 1.  $V_1$  may be a small tetrode such as an 807, 6L6, 6F6 or what have you, depending upon the driving power required by the final amplifier and whether  $V_1$  is operated as an amplifier or frequency multiplier.  $V_2$  is a power-tetrode final amplifier. Although capac-

itance coupling is shown between  $V_1$  and  $V_2$ , link coupling may be used, of course. Driving power is fed to  $V_1$  continuously, and plate voltage remains on  $V_2$  at all times. Grid-leak bias is used for  $V_1$  and  $V_2$ . The keying circuit controls the plate and screen voltage on  $V_1$  and the screen voltage on  $V_2$ , which are all obtained from a common power supply of 500 volts or less. When the key is up there is no excitation to the final amplifier, and consequently no bias on the tube.

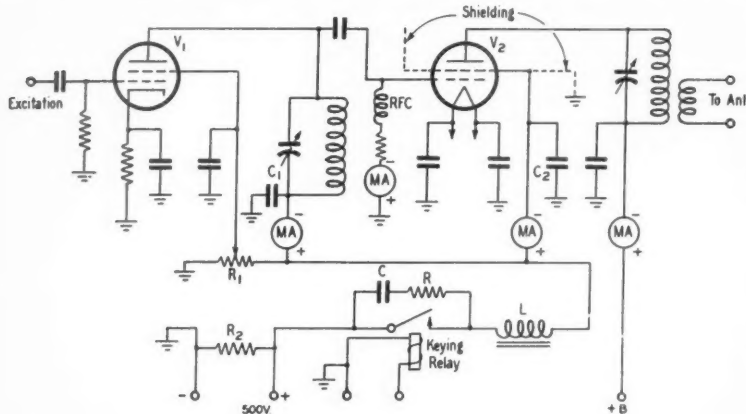


Fig. 1 — Keying the driver stage,  $V_1$ , and the screen grid of the output amplifier,  $V_2$ , eliminates the need for fixed bias on the output stage. The values of  $C$ ,  $R$  and  $L$  (see text) determine the rise and decay time of the characters.

near the oscillator is to fix-bias the following stages, to cut-off or beyond, so that they will draw no plate current under "key-up" conditions. Even if the keyed-stage output is devoid of clicks, each succeeding stage that is biased will tend to "sharpen" the character, and this introduces clicks. Running the stages with just

\* Eitel-McCullough, Inc., San Bruno, Calif.

<sup>1</sup> Smith, "A Medium-Power Bandswitching Transmitter," QST, Oct., 1946.



There is likewise no screen voltage on the final amplifier, and under these conditions the final amplifier will draw only a small amount of plate current. Under normal operation conditions, the key-up plate dissipation of the final-amplifier tube will be well under the maximum rated plate dissipation. Types 4-125A and 4-250A, for example, may be operated in this manner at their maximum rated plate voltage without exceeding the plate-dissipation rating, while the 4-65A may be operated at voltages up to 2000 volts.

Resistor  $R_1$  prevents the screen of  $V_2$  from charging up negatively by collecting stray electrons. A tap on  $R_1$  serves to supply screen voltage to  $V_1$  and, by adjusting this tap, the excitation to the final amplifier may be easily controlled.  $R_2$  is the normal power-supply bleeder.

A small relay insulated to withstand the screen potential (500 volts) is used to do the actual keying. Some relays not intended to be used for keying service exhibit a "bounce" characteristic<sup>2</sup> on the "make" that will make it more difficult to eliminate clicks by filtering. As a precaution, make sure the relay contacts do not chatter. Key clicks may be completely eliminated by the filter  $L$ - $C$ - $R$  in series with and across the keying relay. Choke  $L$  is best selected by trial. A satisfactory choke can be made by using any small power-supply choke, capable of handling the combined currents consumed by the buffer stage and final screen grid, and adjusting the air gap to give the proper inductance, as checked by observation of

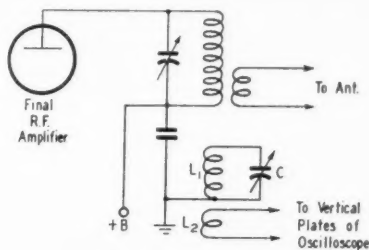


Fig. 2 — Keying can be checked on a 'scope by coupling as shown above. The circuit  $L_1C$  should resonate to the transmitter frequency, and a high  $C$ -to- $L$  ratio is advisable to minimize uneven illumination of the pattern caused by harmonics in the output. The circuit is grounded to protect the 'scope and the operator.

the keying characteristic on a 'scope or by listening for clean keying on the "make" side of the signal. R.f. by-pass capacitors  $C_1$  and  $C_2$  will have some effect on the required value of  $L$  as well as  $C$ . The values of  $R$  and  $C$  are likewise best selected by observation of the keying on an oscilloscope, but for many applications values of 500 ohms and 0.25  $\mu$ fd. have been found quite satisfactory.

<sup>2</sup> Goodman, "Some Thoughts on Keying," *QST*, April, 1941.

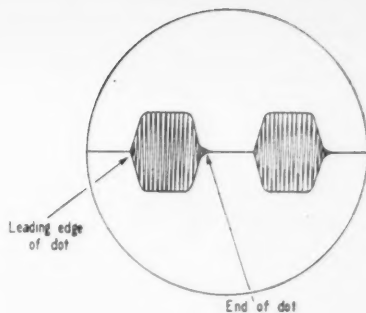


Fig. 3 — A typical 'scope pattern showing two dots with the proper rise and decay times and shapes to avoid clicks.

### Checking Keying on a 'Scope

If an oscilloscope is available, the proper method of adjusting the keying is to use very rapid dots and synchronize the oscilloscope sweep so that the pattern stays fixed in one place on the screen. Radio-frequency voltage is coupled from the final-amplifier plate tank to the vertical plates of the oscilloscope by means of a small tuned circuit of high  $C$  and a link, as shown in Fig. 2. Ground the link end of  $L_1C$  during use. To obtain keying free of clicks it is absolutely essential that the rise and fall be gradual and not disturbed by any rapid changes in amplitude. The value of  $L$  controls the rate of rise at the start of the characters, and the values of  $R$  and  $C$  control the fall at the break. Fig. 3 shows the type of carrier envelope which should appear on the 'scope. Obtaining such a keying characteristic with the system described is simple and surefire.

### IMPORTANT MESSAGE TO ALL VE AMATEURS

The question of the division of our frequency bands between c.w. and telephony is one which merits the serious consideration of all amateurs. In order that the wishes of the Canadian amateurs on this subject may be made known to the authorities at Ottawa, it is requested that each and every one of you advise me — preferably by postal card — of your views. After allowing sufficient time for this canvass to be completed, the results will be tabulated and forwarded to the Controller of Radio, Dept. of Transport, for his consideration before issuing our 1948-9 licenses.

ALEX REID  
Canadian General Manager  
240 Logan St.,  
St. Lambert, 23, Que.



# Hints and Kinks

## For the Experimenter



### A NEW APPROACH TO DIRECTION INDICATORS

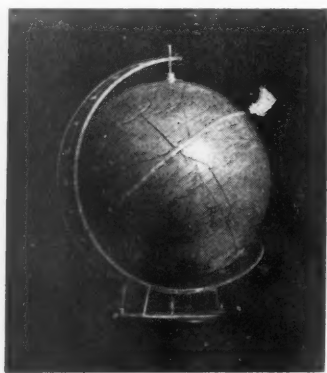
If you've grown tired of calculating great-circle directions and distances, you will find the deluxe indicator shown in Fig. 1 and the photo interesting. It is simple to build, and the cost is slight, because most of the parts are available on the surplus market.

A seven-inch globe was purchased at the local variety store for about \$1. At my home-town location, and at a point directly opposite it on the globe,  $\frac{1}{8}$ -inch holes were drilled and a shaft passed through the entire globe. The lower end of the shaft was fitted with a coupling to connect it to a synchro motor.

A piece of Plexiglas or Lucite was then cut to the dimensions shown in Fig. 1, and a hairline and distance markers were scribed into it with a sharp instrument. Holes were drilled as shown for the bearings for the shaft. The Lucite was then heated in the oven and bent around a  $7\frac{1}{4}$ -inch diameter form. This allowed the Lucite to clear the surface of the globe by  $\frac{1}{8}$  inch all around. A mounting was made of  $\frac{1}{4}$ -inch Lucite as shown, and cemented to the curved piece. The assembled globe and support were then mounted on top of a box that serves as housing for a synchro motor and as a base for the whole unit.

The rotary beam was pointed due north, the hairline was aligned with the North and South Poles on the globe, the coupling screws tightened, and the indicator was ready to go.

No longer is it necessary to calculate great-



The beam indicator at W7QC. A 7-inch globe is rotated by a synchro motor that is coupled to a similar synchro at the beam drive shaft. The globe rotates with the beam on an axis that passes through W7QC's QTH, thus giving direct reading for both great-circle paths and distances.

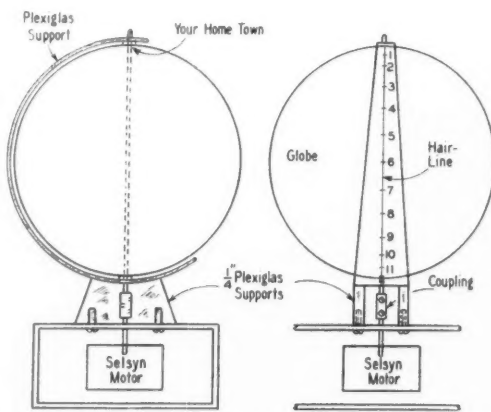
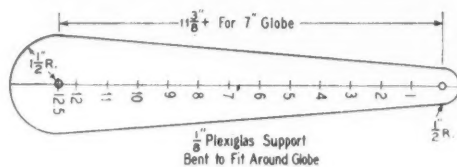


Fig. 1 — Constructional details of the novel direction indicator. The dimensions shown are for a 7-inch globe, and should be modified for other sizes. The curved piece of Lucite is cemented to a base that is then bolted to the top of a box that houses the synchro motor.

circle distances and the point of maximum signal strength of the beam pattern. The globe rotates in sync with the beam, and the line of maximum signal strength is always right under the hairline. [Note: The shape of the Lucite strip does not represent the beam pattern. — Ed.]

— H. M. Buroker, W7QC

### OBTAINING HIGHER VOLTAGE FROM DUAL-VOLTAGE TRANSFORMERS

MANY transformers have a tapped secondary to permit the simultaneous delivery of a high and a low voltage from the same unit. A circuit that permits the output voltage to equal the sum of the original intended d.c. voltages and has the advantage over a bridge circuit of permitting the full current rating of the high-voltage portion to be used is shown in Fig. 2.

With this circuit, it is possible to obtain both plate and screen voltages for a transmitting pentode or tetrode from a single supply without

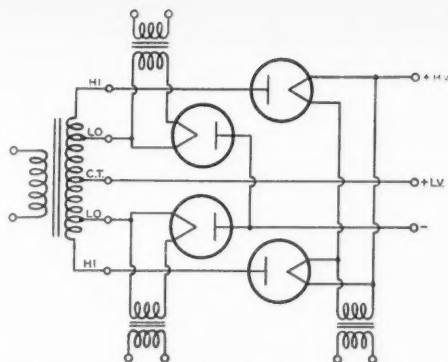


Fig. 2 — Novel rectifier circuit used to boost the voltage normally available from dual-tap power transformers, and permitting both high and low voltages to be obtained simultaneously.

the use of dropping resistors, because it also furnishes power from the original low-voltage taps. The current rating of the low-voltage winding is decreased by the amount of current drawn from the high-voltage taps. Thus, if the simultaneous secondary rating is 300 ma., and 250 ma. is being taken from the high-voltage tap, 50 ma. is available from the low-voltage tap. The main consideration is that at no time should the primary current rating of the transformer as a whole be exceeded.

The use of three separate filament windings is a must if fireworks are to be avoided! — *Albert R. Orvinger, W5HUI*

#### USEFUL FEEDER SUPPORT

THE gadget shown in Fig. 3 comes in handy whenever an open-wire feedline has to be supported at a point or points between the antenna and the shack. Large screw hooks are obtained,

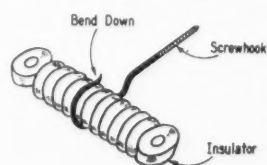


Fig. 3 — A simple device for supporting long feedlines. The construction is self-evident.

and an ordinary glass insulator is clamped within each hook. The feeders are then threaded through the ends of the insulator which serves as both spreader and support. — *Hank Husting, W9RSR*

#### 3-WIRE CONNECTION SYSTEM FOR PROPELLER-PITCH-MOTOR BEAM-DRIVE UNITS

WITH many stations using surplus propeller-pitch motors for beam drives, a common question seems to be "How many wires do you

use to hook the thing up?" A three-wire system seems to be about the best encountered so far. It is shown in Fig. 4. A double-pole double-throw switch with a neutral or off position is used in conjunction with a 115-volt a.c. relay. Of the three wires that must run from the shack to the motor, one is used as a common lead to the step-down transformer and the relay, and the others

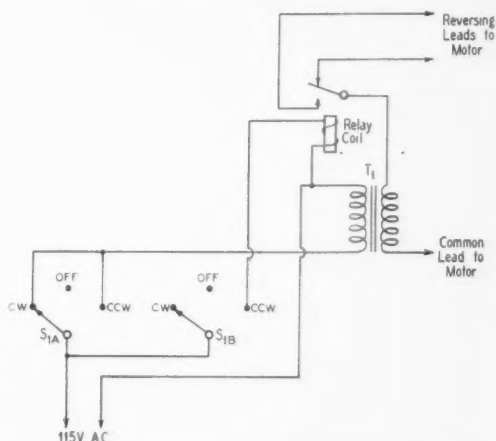


Fig. 4 — Method of using only three wires to control a reversible propeller-pitch motor used as a rotary-beam drive unit. The d.p.d.t. switch has a neutral, or off position. The relay is a 115-volt a.c. s.p.d.t. type.

open and close the relay, causing it to switch the output of the transformer between the reversing leads of the motor, permitting clockwise or counterclockwise rotation of the beam as desired.

— *W1HDQ*

#### OUR COVER

The new code-practice receiver described on page 28 is the subject of this month's cover shot. The beginner shown using the set to learn the code is Barry V. Hurlbut, jr., Headquarters office boy and embryo ham.

#### HAMFEST CALENDAR

TEXAS — Plans have been completed by the Abilene Amateur Radio Club for another of its popular hamfests, this year's affair to be held on Saturday and Sunday, December 6th and 7th. Programmed are contests, talks, excellent eats, prizes and an all-around good time. Further information may be obtained from William O. Ainsley, jr., W5SP, 857 Ross, Abilene, Texas.

**SWITCH  
TO SAFETY!**





# United States Naval Reserve



**H**URRICANE! Elsewhere in this issue the account of Gulf Coast hurricane communications relates the outstanding performance of amateurs and Naval Reserve units in that area. The Naval Reserve district control station (NDF, W5USN) was manned from 10 A.M., 18 September, until 8 P.M., 21 September. The Gulfport Naval Reserve radio station (N8ABA) was manned for a similar period. When the Gulfport Reservists were alerted they couldn't possibly have guessed what was in store for them! During the next few days they were lifesavers in more ways than one. The number of persons rescued was in the hundreds. For a time Reservists housed as many as 2000 refugees in the armories besides distributing food, giving first aid and tending babies!

A total of 247 messages — 155 official — was handled in and out of Gulfport via the two amateur circuits of W5USN. Personal-safety messages were relayed as far away as both coasts. This same station also broadcast the FCC declaration of the existence of a general communications emergency.

Less dramatic perhaps, but highly important, was the work of Reserve circuits in providing wind and barometric readings from half-a-dozen points as the storm's probable course was plotted across the coast, and then inland.

## New Calls Issued

The following Naval Reserve amateur calls have been issued since the list appearing in October *QST*:

K1USN, Boston, Mass.	K5NRX, Albuquerque, N. Mex.
K2NAR, Floyd Ben. Fd., N. Y.	K6NAA, Aonoma, Calif.
K2NRO, Syracuse, N. Y.	K6NAR, Los Alamitos, Calif.
K2NRT, Trenton, N. J.	K6NRE, Terminal Island, Calif.
K3NRD, Hazelton, Pa.	K7NRK, Ellesburg, Wash.
K3NRF, McKeesport, Pa.	K7NRN, Boise, Idaho
K3NRL, Lancaster, Pa.	K7NRS, Roseburg, Ore.
K3NRN, Upper Darby, Pa.	K7NRZ, Phoenix, Ariz.
K3NRQ, Johnstown, Pa.	K8NAR, Groesse Ile, Mich.
K3NRS, Harrisburg, Pa.	K8NRI, Kalamazoo, Mich.
K3NRU, Williamsport, Pa.	K8NRU, Columbus, Ohio
K4NAR, Jacksonville, Fla.	K9NAR, Glenview, Ill.
K4USN, Charleston, S. C.	K9NRF, Danville, Ill.
K4NRM, Atlanta, Ga.	K9NRN, Appleton, Wis.
K4NRR, Owensboro, Ky.	K9NRO, Oshkosh, Wis.
K4NRS, Birmingham, Ala.	K9NRU, Bloomington, Ind.
K5NAR, New Orleans, La.	K9NAA, Ft. Collins, Colo.
K5USN, Austin, Tex.	K9NRY, Hutchinson, Kans.
K5NAA, Weatherford, Okla.	K9NRZ, Topeka, Kans.

Amateurs who are also members of the Naval Reserve are eligible for a certificate assigning

them an official Naval Reserve call, to be used on a Navy frequency in connection with Reserve drills, traffic handling and emergency communications practice. Those Reservists who are not enrolled in any Naval Reserve unit should contact their district Reserve communications officer for more information. Unit commanders will make arrangements for eligible members of their units to obtain certificates.

## Naval Reserve Notes

Electronic Warfare Company 9-190 at Owensboro, Kentucky, using the amateur call K4NRR, helped make the recent North-South Highway Exposition a success by setting up their amateur station to serve the 30,000 visitors. Amateurs in this unit are W4s JXB, KAP, LTQ and LUB.

A quantity of television receiver kits is being distributed to units of the Naval Reserve for training and recreational purposes.

The ARRL *Handbook* is on the list of publications being distributed to all Naval Reserve armories and Electronic Warfare drill quarters.

Naval Reserve radio stations and operators in the U. S. A., Alaska and Hawaii were alerted recently to listen for signals from the U. S. world flyers, Truman and Evans, who were flying Piper Cubs, particularly during their hazardous flight from Japan to Los Angeles via the Aleutians.

## Marine Corps Vets

Former electronics technicians in the Marine Corps who have been discharged since September 1, 1945, are now free to re-enlist at the same rank held at the time of discharge, except that master sergeants will be reappointed to the grade of technical sergeant. The greatest need is for former Marines with the following specification serial numbers: 648, signal electrician; 649, radio technician; 759, radio technician, v.h.f.; 774, airborne radar technician; 775, radar technician; 878, radar-radio technician, aviation; and 879, radar-radio repairman, aviation. To further attract volunteers for duty in the electronics field, the Marine Corps has authorized promotions to the next higher grade for Marine trainees upon successful completion of various phases of electronics instruction.



# How's DX?

CONDUCTED BY ROD NEWKIRK,\* W9BRD/1

## How:

Having been allowed to attempt to fill the auspicious galoshes of such illustrious predecessors as W1CH and W1DX, I hope you'll bear with me in helping to keep things hopping in this department, gang. Me, not even DXCC, yet! Oh, I've tried using an antenna. But I notice that in these parts the boys are stringing them up *outside*. So I'm planning a skywire to fit my own peculiar circumstance. You've all heard of the folded dipole, no doubt. Well, I'm whipping up a folded folded dipole. In fact, it may develop into a *super*-folded dipole, if this housing situation becomes more acute. And, to make matters worse, even W6QD won't work me any more, now that I've moved away from W9! Introductions being completed, I now become "we," and we'll get down to cases. As everyone knows, *you* fellows really write this column; we're merely around to coagulate it, so to speak. It's your baby, so let's have it.

Brethren, the sermon for the month will be short and simple. It has been expounded before, but with the ever-increasing number of new DX enthusiasts, we believe the matter important enough to risk repetition. Briefly, when a DX station isn't in the *Call Book* and requests you to "QSL via ARRL" (or any other designated agency) do just that, *even if you happen to know*

\* DX Editor, QST.



• As mentioned last month, W1CH is unfortunately unable to continue handling this column. The torch was ably caught by W9BRD/1, Rod Newkirk of W1AW, and Rod will carry on with the help of Jeeves and the DX gang. — Ed.

his real mail QTH. Attempts by a few overeager QSL chasers may well serve to place a distant friend right behind a great big eight ball. And possibly behind a flock of very-close-spaced vertical iron dipoles (fed in phase). So take it easy, please.

Now let's see what's going around around here.

## What:

Eighty meters is again giving the boys a run. Reports are slim to date, but we know the stuff is being worked and next month's mail should tell the tale. At any rate, W1NJM snagged HB9DD and G5LI . . . . . VE1EA nailed G3AKY, G4-QK, GM4MF and VO2R (all around 3575) . . . . . W1ORP hears Gs as early as suppertime, so the band should be pistol-hot this season . . . . . Our friend, the late Bill Matchett, W1KKS, as his last contribution to this column, reported FA8BG, GD3UB (3555) and LB4QA (3555), the latter a whaling ship south of the Canaries.

Forty is still paying off for those willing to dig beneath the rag-chews. W0VIP was bowled over by KM6AA (7105) at 1:45 p.m. CST. Bud also nabbed W5MUS/KS4 (7265) and KL7HR (7090) . . . . . W1AW's log shows ZL4IH (7050), GW3CAY (7050) and CT1PC (7150) . . . . . W1AQT reveals contacts with HB9CE, OK2OS, YU7KX, D2GC, ZB2B, UB5KAB, I1PL, CT1AZ and TI6CR. Bob now has 109 postwar.

Twenty keeps rolling along like Ole Man River, though. W6ZZ's fine list included J2AEA, J4AAY, J9AFA, LU2HH, HB9AW, VP8AI and EI9N . . . . . W2BRV reached 127 postwar with CP1AT, HA2AB, SV0AC, VQ2JC, W3KXO/Iwo Jima, VR2AP, VR6AA and ZS3D . . . . . W0NUC, with 102 of 135 postwar confirmed, isn't complaining about CR6AI, TF3MB, UI8AA, VP8AI, VQ5JTW, VS4VR and VR2BG. Leo's card from VR5PL states, "The first VR5/W contact ever made." . . . . . With a vertical and an 807, W2LRG submits an impressive list including D4ALN, D4AND, HP4Q, GI5DX, GI5UR, EI4Q, LA6U, KS4AE, OX3MG, SM-

7SH, VP5MU, OK1CO, OK2NR, OK2EL and scads of Gs and VKs . . . . . KP4KD grabbed MD5BU, CR4AX, VP2AA, VP8AD, VR2AR and ZM6AF to reach 116 . . . . . W2ITD scored with CN8EG, CT1LZ, CT1A, CT1JS, HZ1AB, FA9HS, PK3CK, OH3NA, LU1ZA, VP8AI, KA6FA, VQ4KTH, ST2AM, UG6AB, UA1AR, UR2KAA, YU7KX, ZE1JI and ZS1N, for 126 postwar countries . . . . . Ex-8KKG, now W4LHQ, raised CR7AF, W2WMV/C9, CT1A, MD5BU, UA9CC and ZB1AH from atop Missionary Ridge, Tenn. . . . . VE5MW broke in with D4AND (14,150), OX3GG (14,100), F8BX (14,100) and EI9N (14,100) . . . . . VE1EP, now VO6EP, collared HI8MAF to make it 100 postwar before moving up to Goose Bay . . . . . W3LCV didn't need more than a 6L6 at ten watts to work G2PN, G5XW, EI9N, CN8EG and VO4J . . . . . W6BXL cleared 121 postwar with such as VQ2HC, HC1JW, TA3SO (14,037), EP1AL (14,003), LI2B (13,995), VP8AI (13,995), VP4TAE (14,000), FQ3AT (14,100), YA3B (14,075), EQ2L (14,010), VS7IT (14,130), ZD4AB (14,005), VS2CB (14,100), W0MCF/C6 (14,150), KA6FA (14,075), PK6TO (14,075), UG6WD (14,103), UA6AA (14,072), UA4FC (14,060), UH8AA (14,055), UR2KAA (14,075), UA3BD/UC2 (14,065), UA9KCA (14,065), UB5AC (14,045), C4RK (14,110) and PK5LK (14,065). Whew! . . . . . Another member of the single-6L6 club is W7JGU who snapped up KS4AC (14,030), KH6LF (14,120), ZL4CK and some VKs . . . . . W4FIJ is still pinning them down, his latest being CR9AN, CR6AI, HS1LN, PK6EE and PK7HA. Norm also wound up a 1-hour-and-51-minute WAC with VS9AN, KP4EX, VP4TAG, KH6LF, ZS5BN and YR5KP . . . . . Still running ten watts (to an 8-element beam), W6MHF toddled off with CN8EG (14,050), J9SIR (14,070), VP4TAA (14,010), ZE1JI (14,130), J8AAI (14,010), ZD4AB (14,090), VR5PL (14,120), KP6AB (14,010), CN8BK (14,001) and KX6USN. What is the countries-per-watt record, anyway? . . . . . VE1EA escaped with UH8AA, K6SBU/KG6 (14,070), J3AAD (14,115), J4AAK (14,115), J5AAL (14,060), ZD4AI (14,065), ZS3D (14,070), OX3MG (14,175), W2WMV/C9 (14,060), HZ1AA (14,005), CT1A (14,125), VS2CB (14,105), HA1KK (14,100), UI8AA (14,025), UA9CH (14,025) and CX4CZ (14,010) . . . . . W1JLT popped up with W3LTK/Antarctica (14,100) . . . . . VO3X warmed up the new vertical dipole on VK2DI, VK7LZ, GM3BQM, GW3CR and LA6U . . . . . In the 'phone section we have W2ITD with

J2HYS, J2AAT, XAMC (Trieste), HI8WF, VQ4NSH and J9ABH . . . . . W2ZJ tried n.b.f.m. on his kw. and drew forth G3MK, ZL1CE, VP5RS, VR3A, HC1JW, PY7AD, EL3A, KP6AA and J2AAG. All that and no BCI!

Not specifying band worked, but assumably twenty c.w., W7DXZ glommed onto VU2RW, EP1AL, HC1JW, TI2ES, VQ8AF, TF3MB, CR7BC, CN8EF, CN8EG, CN8BK, C7OK, C9JW, PK6JV, PK6CR, UG6WD, UQ2AB, UA3BD/UC2, UB5AC, UB5BE, UB5BD, UG6AB, UI8AB, UA9CF, I6USA, MB9AM, MD1D, VS2BR, VS4VR, VQ2HC, YR5Q and OX3GE. All while handling that W7 QSL bureau, too! . . . . . Among his other remarks, W6MX informs us that he tagged MB9AM, MD5KW, YU7KX, EP1AL, TA3SO, VQ3ALT, ZD4AM, GD2FRV, YR5PK and YR5VP . . . . . W6AY, although rock bound on 14,060 kc., tallied up and found he had worked 343 different Europeans this year, including 136 Gs . . . . . KH6LJ's new 4-element on 20 paid off with 76 Europeans in two weeks! . . . . . VK2AHM's 1-watt WAC included W6VDJ, VS1BG, ZS2AL, G5RF, ZL4AO and CE1AH (we said *one* watt!) . . . . . W1AQT snatched ZD4AL, ZD3B, CR6AI, ZS3F, TA3SO and VQ5JTW.

Ten meters has perked up something terrific in spots. If you don't think so, W4ELR reports having scraped up UA3AC, UA3BM, CR4AX, ZS6GO, ZS6KS, HB9BX, HB9DZ, LU1DZ, ZL1BY, LA4P, PA0ALA and others, with 30 watts and the inevitable 3-element rotary. All that stuff in one day, too . . . . . W1GOU, sticking to 'phone, latched onto VQ4ERR, VQ4NSH, ZL2LL, ZL4BN, VK5LC, CT1PW, CT1QA, ZC6JP, MD5TS, GD6IA, ZS4P, VU-2KM, J2COM, VS9K, VS9AB, OH1OD, KM-6AB, W2WMV/C9, LZ2AB, XAMC (Trieste), CM9AA, ST2MP, ZB1S, ZD2KC and ZS6OL. (Quick, Jeeves, the converter!) This makes 106 postwar countries on 28-Mc. 'phone for Ernest. He uses a BC-610-E and a 3-element rotary . . . . . But here's W9KOK with another list a mile long, such as J8ACS (28,375), J8AAA (28,100), VR6AA (28,270), ZC6JP (28,480), XZ2YT (28,250), ZD2KC (28,160), ZD4AL (28,250), W6VKV/I6 (28,437), CR7AL (28,250), ZE1JO (28,290), MD5AF (28,125), VU2GB (28,400), ZD4AB (28,187), CT1QA (28,200), ST2MP (28,200), KG6AW/VK9 (28,700), ZS4P (28,062), KJ6AA (28,700) and OH6NS (28,150). This brings Mitch up to 124 countries . . . . . From W6HG we hear that VK5BF eked out a 1-hour-and-40-minute 'phone WAC using the

WAC with less than one watt! Behold the station of R. J. Whyte, VK2AHM. The HY60 final runs cool with 160 volts at 5.5 ma. on the plate. On 'phone a 1J6G is used as Class B modulator.



QST for

Dece

This neat layout belongs to Les J. Scott, ZS6FU. An 807 running at 28 watts input feeds a 28-Mc. 3-element rotary. Modulator is a pair of 6L6s. ZS6FU has obtained excellent DX results on 10 'phone.



receivers of W6WTH, ZL2AT, HK3DW, ZS6IW, J2AMA and G2HCL. . . . W6ZZ dropped in for KH6LT/KW6, KJ6AA, KM6AB, KP6AA, ZM6AF, HC2OA, PY3AH, VK4RF, VQ2JC, OK1RW, G6BW, J2FOX, JSACS, J9AFA, W2WMV/C9, KL7GI and KL7FQ.

### Where:

Here are a few QTHs that should hit the spot:

C4RK, P. O. Box 163, Kunming, China  
C6KD, John B. Kenkel, P.O. Box 22, Navy 3913, c/o FPO, San Francisco, Calif.  
C9JW, Wei Tsu Ye, Bank of China, Mukden, Manchuria  
CR6AL, Box 51, Lubango, Angola  
HA1KK (QSL via W2IOP)  
HE1EO (QSL via HB9EO)  
HS1SS, T/Sgt. D. J. King, c/o U. S. Military Attaché, American Embassy, Bangkok, Siam  
J8AAW, 111 Sig. Svc. Co., APO 235, c/o PM, San Francisco, Calif.  
J8ASC, APO 235, c/o PM, San Francisco, Calif.  
KA6FA, Box 392, Ilo, Panay Island, P. I.  
OA4CS, Wilson H. Moore, Ground Training Division, Pan American Grace Airways, Lima, Peru  
PK5LK, Air Strip, Balikpapan, Dutch Borneo  
PK6AX, Lt. E. A. Krygsman, R.N.N.R., 10 Cantine Laan, Makassar, Celebes, N.E.I.  
TA3SO, M. Aritay, Devlet Hava Yollari, Ankara, Turkey  
VO6EP, Arthur S. G. Grant, c/o Meteorological Office, DOT, Goose Bay Airport, Labrador  
VP2AA, AACSD DET., APO 855, c/o PM, Miami, Florida  
VP4TAF, Joe McKay, NAS Comm., Trinidad, B.W.I., Navy 117, FPO, N.Y.C.  
VR3A, Washington Island, Central Pacific, via Fanning Island  
VS2BX, Radio Club, Royal Signals, Hq. 25 Inf., BDE, Kluang, Malaya  
VU2CS, L. W. Ford, 12 Commercial Row, Darjeeling, India  
VU2FS, Evans Dawson, 9 Daeres Lane, Calcutta, India  
VU2LL, A. Banerjee, P. 511 Aswini Dutt Rd., Ballygunj, Calcutta, India  
VU2QS, Phil Marden, 2 Coy. Southern Command Signals Regiment, Colaba, Bombay 5, India  
W2WMV/C9, Box 10, Navy 3930, FPO, San Francisco, Calif.  
W3MPM/C7 (QSL via ARRL)  
W6TMY/Saipan, Box 4, Hendrum, Minnesota  
W6YAW/AK, Don Dow, Box 497, El Monte, Calif.  
W8QSJ, Iwo Jima, CAAB, APO 86, c/o PM, San Francisco, Calif.  
XAFX, 3196 Sig. Svc. Co., APO 782, c/o PM, San Francisco, Calif.  
XZ2DN, S/Ldr. H. Pain, Officers' Mess, RAF, Mingaladon, Burma  
ZC1AL, Post Office, Mafrag, Transjordan  
ZM6AF, Box 90, Apia, Samoa  
ZM6AH, Box 57, Apia, Samoa  
ZS3F, Box 297, Windhoek, Southwest Africa  
ZS3G, Box 513, Windhoek, Southwest Africa  
For the preceding list we are indebted to W1CH, W1DX, W1NMP, W1QMI, W2CDP, W2DKF, W2QHH, W2ZJ, W3BKZ, W3MLW, W2WPM/C7, W4MZ, W4LHQ, W5LKH/MM, W6BXL, W6OJW, W8SO, W8VIP, O4ACS, VO6EP, XZ2EP and others.

### Tidbits:

W2TXB passes along some interesting dope on conditions in a few countries "over there." Many of our less-fortunate brethren are operating on a shoestring these days and old *Call Books*, *QSTs*, spare equipment, etc., are at a premium. . . . W2FK (and NY4AD) is now VP4TAF. . . . W5LKH/MM will be looking for QSPs to New Orleans while operating ten and eleven. Rolf states that the scarcity of VUS on ten is because of lack of high-frequency crystals. . . . G2PU went to heavier construction after losing two 70-footers in a 100-m.p.h. gale. . . . Ex-KS4AE can be reached at his new KA1 QTH: Wm. C. Wayne, Civil Aeronautics Admn., APO 900, c/o PM, San Francisco. No new call yet, though. . . . W9HJP is now VO2AV and laments the fact that some of the boys impolitely hang up on a QSO when the going is a little tough, not even bothering to sign. . . . Through W2GMM we hear that F9HE, F8KI, F9BO, FSTU and F8QQ have resolved to operate the high end of ten (29,500 to 29,900) to spread out the QRM. A step in a good direction! . . . MD5BU (XABU) has gone home for leave and will use his father's outfit, ZL41C, for a while. The Major expects to return to Europe for another juicy call assignment. . . . VS6AC reports through W6AJ that VS6 power is limited to 25 watts, no 'phone, and reports maximum activity on ten and twenty. . . . XZ2HP will take over XZ2DN's gear, the latter feller heading back to G shortly. Harry also reports that AC4YN has never worked G or W on 10 'phone, and that may sadden someone. Furthermore, AC4YN was so disgusted by DX hawks in a recent session with Ws that he pulled the switch. Let that be a lesson to a few. . . . W8SO planted the DX bug in Ankara before leaving and we should still be hearing TA3SO from time to time. . . . W2QHH informs us that LX1AX is a wooden nickel; also that ZC1AL is now the only legit ZC1. . . . KX6AF and O4ACX worked each other for each station's initial contact! . . . ZS4P wants cards to come only through the South African bureau, no coupons and no airmail direct. But he vows QSL 100 per cent.

Well, we're going home now to camp on that CM2's frequency again all night. Never say die, they say. We're going to rip out that bedspring-counterpoise idea and try a piece of wet twine.

# A Universal Transmission Bridge

## An Easily-Constructed Device for Checking Line Terminations

BY JOHN M. TIFFANY,\* EX-W3CQN, EX-W2GGK

THE radio-frequency bridge described in this article is admittedly a "steal" from the r.f. power monitor which comes with the new Western Electric f.m. broadcast transmitters. The robbery can be justified by the fact that this version takes the W. E. monitor, turns it inside out, and makes it a practical ham gadget that can be made up mostly from the junk box. It isn't a fussy gadget, and the initial model worked the first time with no tinkering except to adjust it for the desired range of resistance measurement.

The instrument is particularly helpful in making adjustments to tune out reactance and to adjust circuits to look like the right number of ohms. It has a range of resistance measurement from approximately 40 ohms to 400 ohms and up, continuously adjustable. This obviates changing resistors every time a different value of load is measured. Tests indicate no appreciable

error attributable to frequency over the range from 2 Mc. to 50 Mc. Although the null is pretty broad at broadcast frequencies, it becomes sharper as the frequency increases. The accuracy appears to be as good at 50 or 60 Mc. as at 2 Mc.

The monitor from which this was modeled is a coaxial affair intended for use with gas-filled coaxial lines. The essential difference between the two is that in this version the inductance is in series with the inner conductor whereas in the original W. E. version, the inductance is in series with the outer conductor. The former arrangement is desirable for a portable unit since it keeps the box and controls "cold" for r.f. potentials. The bridge discussed here has fittings for solid-dielectric coaxial lines. There is no reason why terminals for molded parallel lines, or open-wire lines, can't be used equally well. In the case of

balanced lines, the box is "hot" for r.f., so must be kept clear of grounds.

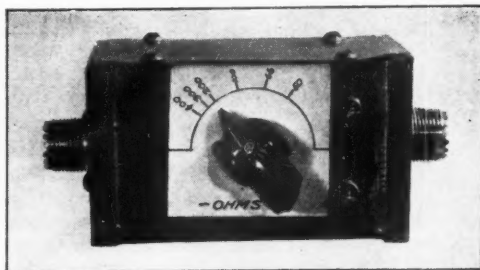
The current through resistor  $R_1$ , Fig. 1, exists because of the voltage across the transmission line. At higher powers, this must be a power-type resistor.  $R_1$  in the bridge described is made up of three paralleled 1500-ohm deposited-carbon resistors. They are each rated at 0.5-watt dissipation, so they can easily be overloaded. This obviates the use of the bridge as a power monitor, but if larger resistors are available, the power capacity of the bridge can be proportionately increased. Impedance and standing-wave measurements can be made equally as well at low power as at high power. It is not good practice to jam up the band with testing at high power.

### Description

The circuit is basically a Maxwell bridge. The condition for balance is  $X_L X_C = RZ$ .

Expressed differently,  $L/C = RZ$ . There is no term for frequency in the last expression, so the bridge is not frequency-conscious. As mentioned above, this has proved to be true over the range tested. The circuit is shown in Fig. 1. The inductance is approximately 3 microhenrys, and the variable condenser covers the range from 10 to 100 micromicrofarads. Resistor  $R_1$  should be a really good resistor. As a rule, composition resistors tend to look like condensers, changing as the frequency goes up, so it is recommended that you use the best resistor you can get. Resistors which have appreciable reactance introduce a phase shift that will prevent a zero current reading on the meter. This will make the standing-wave ratio look worse than it really is, and it is hard enough to get a low s.w.r. without the bridge making it harder. The resistors used in this bridge are the best obtainable, and are not very costly. They are the Western Electric Type 144 deposited-carbon resistors designed to have very low reactance at high frequencies.<sup>1</sup>

The photographs show the location of the parts of the bridge, and very little explanation is necessary. If you make it according to the drawing and photos, it will work. The box is made of 0.010-



The bridge is enclosed in a homemade copper box measuring  $2 \times 2 \times 3\frac{1}{2}$  inches. This model is equipped with fittings for coaxial cable.

\* Equipment-Specialist, Western Electric Co., 120 Broadway, New York City.

<sup>1</sup> These resistors (and the Varistor) are available through Graybar representatives and local radio dealers. The IRC Type MPM resistors, also a deposited-carbon type, should serve equally well. Ordinary composition resistors in the  $\frac{1}{4}$ - or  $\frac{1}{2}$ -watt size can be used, but with a probable sacrifice of performance from 14 Mc. up.



• Here's another in the rapidly-growing family of standing-wave indicators or directional couplers. Simple to build, not particularly critical as to layout, and useful over a relatively wide range of impedances.

inch sheet copper bent to form three sides, with a flange around the opening for a cover on the fourth side. End plates are formed up and soldered in place, as shown. Brass hex nuts are soldered in place under the holes in the flange to accommodate the cover screws. The variable Erie Ceramicon,  $C_1$ , must have a shaft soldered to the rotor to accommodate the control knob.

The meter is not included as a part of the bridge circuit; instead, the rectifier and the meter bypass condensers are wired in the circuit with short leads, and the meter leads are brought out through two resistors which tend to isolate any r.f. that would appear at the meter terminals and which might cause trouble by introducing stray capacities. The feed-through condensers at the meter terminals keep all exposed parts at the outer box potential, which, in the case of coaxial unbalanced circuits, is essentially ground potential. A 0-100 microampere d.c. meter makes a good null indicator, though a 0-1 millimeter is entirely satisfactory. Since the meter is not a part of the circuit from the r.f. standpoint, a volt-ohm-milliammeter with test prods for leads is very convenient.

### Calibration

Each bridge will have to be individually calibrated. That is because it is not reasonable to expect that you will make an inductance exactly

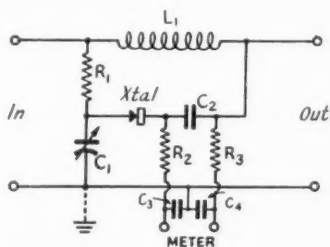


Fig. 1 — Circuit diagram of the transmission bridge. The meter should have a full-scale range of 1 milliamper or less.

$C_1$  — 10-100- $\mu$ fd. Erie Ceramicon variable.

$C_2$  — 470- $\mu$ fd. mica.

$C_3, C_4$  — 100- $\mu$ fd. mica (optional).

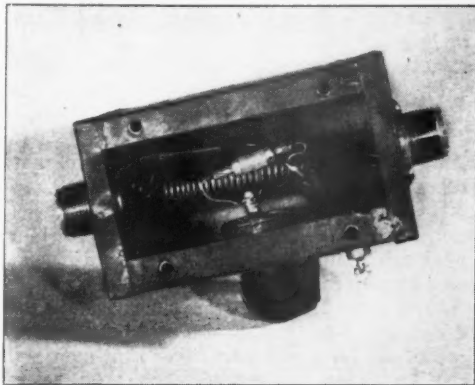
$R_1$  — 500 ohms (3 W.E. Type 144 deposited-carbon resistors in parallel, 1500 ohms each, 5% tol.,  $\frac{1}{2}$  watt).

$R_2, R_3$  — 10,000 ohms,  $\frac{1}{2}$ -watt carbon.

$L_1$  — Approx. 29 turns No. 18, diameter 0.6 inch, 2.5 inches long.

$X_{tal}$  — W.E. Type 400 Varistor or 1N34.

like the one described here. Variations will result in shifting the range of resistance covered. A small  $L_1$  will make the range cover only the small resistance values, and a large  $L_1$  will cover only the larger resistance values. Prune  $L_1$  until the range is what you want. Calibration is done by substituting resistors of low reactance and known resistance for the load. The following values of load resistors are suggested: 30, 50, 75, 100, 200, 300, 400 and 600 ohms. The little  $\frac{1}{4}$ -watt com-



This inside view shows the simplicity of the device. The coil extends the length of the box. The bridge resistor,  $R_1$  (three resistors in parallel), is in the upper left corner. The meter resistors and by-pass condenser are at the lower right.

position resistors are not bad for this use because of their small size. (At high frequencies, when calibrating, the meter won't read zero because of the reactance of the calibrating resistors, and the resistance calibration will be inaccurate. Calibration at frequencies below 5 Mc. is suggested.) A resistor soldered in the male end of a coaxial connector makes a good termination. Make a paper dial on the condenser control and mark the point at which the bridge indicates a null for the particular value of resistance you use for calibration. Replace the resistor with the one having the next value, and repeat the calibration. The low-resistance calibration points are pretty well spread out, and the high-resistance points tend to crowd together.

### Operation

When the bridge is balanced, it is only aware of the energy appearing at the output terminals because of reflections from the load, making it a convenient directional coupler and standing-wave detector. When used for adjusting a transmission-line termination, the output terminals of the bridge are connected to the input of the line, and the input terminals of the bridge are connected to a source of r.f. at a power level of 5 watts or less. This source of r.f. can be your transmitter

(Continued on page 120)

# Paradise Regained

or, Do You Want a Kilowatt?

BY BYRON GOODMAN,\* W1DX

JOHNNY GREY, the president of the club and an all-around amateur, was just walking out of Glibstein's Ham Emporium when he ran into Jimmy Snerd.

"Hi there, Jimmy. How's DX?" As he greeted his friend, Johnny twisted the package in his hand to show off the label to better advantage.

"Hi yourself, Prexy," Jim answered. "It wasn't too bad this morning. I finally got that VR2 and another C9, but I missed the CR10."

"He listens off his frequency, about 10 kc. lower," Johnny nonchalantly replied. "I got him a week ago." He waved the package so his friend would be sure to notice the label.

"No wonder I couldn't raise him. Thanks for the tip. Say, I see you have a new bottle there. Kind of big for a guy who never runs over 300 watts."

"Yep, I've finally decided to go high power. I've been missing too many of them lately," replied the club president.

"Well, let's hope you're smart and don't get hung up across the hot stuff," said Jim. "We don't want to lose another club president as we did Elmer."

"Don't worry about me. Elmer got bit because he was careless and had a haywire rig. Mine is going to be right before I ever go near it. But it sure was a shame about El — he was a good president and a swell DX man."

"He sure was," agreed Jim. "Well, I've got to get a condenser before Glib closes. The FCC decided the d.c. regs apply to me too, and sent me a notice today. See you later."

"So long." Johnny walked slowly over to his car, thinking about Elmer and softly whistling "He Was the Best President We Ever Had."

Elmer walked along the road a bit unsteadily, still shaky from the shock. The lane wound slowly up a hill, the highest one around, and at the top Elmer could see a small cottage with four masts around it. As he got nearer he could see that each mast supported the corner of a rhombic antenna. Elmer guessed the legs of the rhombic to be about five wavelengths on 20, and decided it must be a nice deal. When he got to the door of the cottage he found it open, and he hesitated only a second or two before walking in.

He was amazed at what he saw. All along one wall were separate transmitters (one for each band, he decided instantly), and there was an operator

seated at the table in the center of the room, slowly tuning a receiver. There was a slight smile on his lips.

The operator looked up, saw Elmer, and put the 'phones on the table. "Hello there," he said.

"Hi. My name's Elmer . . ."

"Yes, I know," interrupted the operator, "we've been expecting you. My name's Joe Digges. Been a ham since the spark days, but I got careless once, with one hand on the mike and the other on the rig. All the gang hangs out here. The others will come along later — right now they're down at the monthly hamfest. A grand bunch of old-timers, and some young squirts with promise, too."

"Sounds wonderful!" Elmer was itching to learn about the rig. "What's the deal here in the club. Is this the station?"

"Yes," said Joe. "You can have one like it for yourself if you want, but most of the fellows hang



out here. It's a nice rig — separate kilowatts on each band, with a switch to boot it up to ten kw. if you want. The receiver drags in anything almost anytime."

"Boy, oh boy, oh boy!" exclaimed Elmer, as his fingers began to twitch. "But what about the antennas? I saw only one rhombic as I came in, and it was terminated."

"Oh, that's simple," replied Joe. "The hill rotates."

"Ha, ha, ha," said Elmer. "You know what I thought you said? I thought you said 'The hill rotates.'"

"That's what I did say. We need only one rhombic because we rotate the hill. That way we have no interaction with other antennas. We can also raise and lower the rhombic, with this switch

(Continued on page 122)

\* Assistant Technical Editor, QST.

# 'Phone-Band Phunnies

## The Reluctant 'Phone Man



EVERY 'phone band has one of these. You never hear him on c.w., but he spends all his time on 'phone telling how much he loves the good old brass pounding.

"Yes sir," he will say, "This 'phone business is all right, I suppose, but I am a c.w. man at heart and always will be. I just come up here on 'phone once in a while to see how the other half lives, but I'm really at home when the old bug is slinging about forty words per minute at me."

He goes on and on if you do not stop him; but stopping him is really quite easy. All you have to do is to plug in your key and go back to him at a nice, gentle twenty-five words a minute. No matter how clearly you send his call, he will come back, "I say, OM, what is the matter? I do not hear you at all. All I hear is a c.w. station on there testing."

If you persist long enough, and send slowly enough, it will finally dawn upon him that his bluff has been called — and he will immediately be called to lunch, to the telephone, or to some other place that prevents his staying to copy his beloved c.w.

The next time you hear him, though, he will still be pining for "the good old talking with my fingers." A little research into his background will invariably reveal that he has been exclusively on 'phone for years. His c.w. ability is so much wishful thinking. To his way of thinking, ability to handle the code means ability as a ham; so he struts his false c.w. claims up and down the 'phone bands, where he feels there is little danger of having his bluff called; for, aren't all 'phone men *per se* c.w. lids? — John T. Frye, W9EGV

## SWITCH TO SAFETY!



## 25 Years Ago

this month

DECEMBER 1922 *QST* set a new record for size, the 176-page Christmas edition crowding its binding. Reported extensively are the final preparations by Traffic Manager Schnell's Operating Department for the important business of the month, the Third Transatlantics. To lend a bright note to this Yuletide 20-day transmitting-and-receiving activity, and at the same time spur us on to greater effort, we learn of cabled reports of reception by British amateurs of the preliminary c.w. transmissions of 2ZK, 2HJ, 2EL, 2AJL and 1CX; unidentified Fifth and Ninth District stations also were heard. Must reading for participants is Paul F. Godley's "Listening for Europe," "Paragon Paul's" expert advice on how to hear the elusive ones. Counsels *QST*'s editor, "Full power in the first ten days; absolute quiet the next ten; and the highest embodiment of the spirit of team-work; and success is ours! Best o' luck, O.M.!"

It is only natural that discussion of receiving circuits and techniques receive special attention in the technical columns at this time. Accordingly we read "Notes on a Superheterodyne," by C. R. Leutz, "A Superregenerative Tuner," by James Wood, jr., 2ALG, "An Armstrong Single-Tube Superregenerator," by William Englebreton, and "A French Amateur's Circuit," K.B.W.'s description of the regenerator-and-3-stage used by Mr. G. Perroux in successfully receiving American 1ARY in France earlier this year. A newly-developed application of the Dictaphone is unfolded in "Recording Signals," a timely article.

With c.w. making heavy inroads into the spark ranks, H. S. Morris, 8BDA, comes to the front with a full defense of the latter: "A Spark Set That Will Hold Its Own." On the c.w. side, L. W. Hatry, 5XV, discusses "Some C. W. Experiments and Results" in chronicling his experiences using low power. Another low-power c.w. advocate is George Milne, 2AFP, who describes in detail "A Five-Watt C. W. Set."

Further technical gleanings are 7BK's description of a "Radio Lizz," the receiver-equipped flivver belonging to 7AD. Norman A. Woodcock, Cardwell engineer, writes informatively of capacitor design in "A Chat About Variable Condensers." With emphasis on personal safety, Norman R. Hood, 7ZO, elaborates on methods of replacing broken antenna wires, pulleys and hal-yards, under the title "Saving Your Neck." And for the ham of practical bent, J. A. Miller's (3LF) "An Electrolytic 'A'-Battery Charger" meets a crying need. More "Notes on the Design

(Continued on page 158)



# The World Above 50 Mc.

CONDUCTED BY E. P. TILTON,\* W1HDO

**R**ECORDS — RECORDS — RECORDS! From 6 meters to the microwaves, the world above 50 Mc. was riding high in October, the month's end finding us with no less than four of our bands carrying new DX records for two-way work. The 10,500-mile QSO between CE1AH, Chuquicamata, Chile, and J9AAO on Okinawa practically put us out of the records-keeping business on 50 Mc., and international DX was worked on all continents. No two-way record for 144 Mc. was made, but reception of Chicago-area stations in New Jersey opened the way for a 700-mile two-way QSO between these points. On 235 Mc., W1CTW, Arlington, Mass., and W2HWX, Little Silver, N. J., got together for a new record of 210 miles. Working from two Massachusetts mountain tops, W1JSM and W1LS raised the 2300-Mc. record to 66 miles, and W1JSM worked W1OTH over the same path on 3300 Mc. This contact was a short-lived record for 3300 Mc., however, as the 150-mile work of W6IFE and W6ET took place later in the same afternoon!

With the current sunspot peak running far above previous cycles in the history of radio communication, the maximum usable frequency for  $F_2$  propagation is passing 50 Mc. in many parts of the world, and international DX was worked almost daily during October. Some of this was reported briefly last month, but here is the day-by-day story, on the basis of reports thus far received.

October 3rd: XE1KE worked LU6DO and LU9AX, and heard PY2QK.

4th: ZS1P, Capetown, South Africa, worked G5BY, South Devonshire, England, crossband, 50-28 Mc.; the first 50-Mc. DX ever worked from ZS. Time: 1413-1434 GCT. OA4BG, Lima, Peru, worked LU1CC, LU9AS, LU4DT, LU6DO and LU4AK.

7th: W6UXN, Inglewood, Calif., heard J9AAO, Okinawa, 7 p.m. PST.

11th: New 50-Mc. record — ZS1T and ZS1P worked PA0UN, Eindhoven, Holland, 6000 miles. W4GJO, Orlando, Fla., worked OA4BG seven times between 1:46 and 6:30 p.m. EST. W4EID, Jacksonville, and W4QN, Orlando, were also worked by OA4BG, and W5FSC, W5FRD, W5JLY and W9ZHL were heard in Lima, these other call areas being heard only between 2

## 50-Mc. DX Continues

Band Open Daily for Trans-Atlantic and Transcontinental Work!

As we go to press the series of daily 50-Mc. DX openings continues. Beginning with October 25th the band was open to Europe every morning but one for 15 days in a row, and European contacts have been made by scores of stations in W1, 2, 3, 4, 8, 9, and VE1, 2 and 3. Signals have gotten across the Atlantic as early as 7 a.m. EST, and on frequencies as high as 52.5 Mc., and the band has remained open to Europe as late as 1 p.m. Beginning with October 29th 50 Mc. has opened for transcontinental contacts at about 11 a.m., remaining open for as much as four hours.

On Nov. 1st, KL7DY, Sitka, Alaska, worked numerous W2, 3, 4, 5, 9 and 0 stations, even though he was using 51.2 Mc., normally thought to be above the optimum frequency for  $F_2$  work under present conditions. W6OVK, Redwood City, Calif., worked 48 different stations in nine eastern states and VE1, 2 and 3 on Nov. 2nd. Transcontinental QSOs were made with as little as 3 watts input by several W6s on Nov. 1st. On Nov. 3rd, the band was open in W1 for Europe and the West Coast simultaneously at 11 a.m. EST, indicating the possibility of W6 and W7 contacts with Europe.

In order to minimize QRM and facilitate DX contacts for all, everyone is urged to follow the operating schedule set up last year for European tests: Transmit on the hour and at 15-minute intervals thereafter for 5 minutes, listening on 50 Mc. for replies. After 2 minutes, if no DX reply is heard, listen on 28 Mc. for crossband contacts. And — use c.w.!

Nov. 5th Extra! Gs Get 50-Mc. Permits!

and 3:30 p.m. EST. South American commercial harmonics were heard up to 50 Mc. during this afternoon by W2BYM.

12th: W7ACS/KH6, Pearl Harbor, worked W7QAP, W6s KD, FSH, NAW, W5VY, W6s JRM, UXN, QG, SSK, OHM, CLO, QXB/mobile, TBS, BWG, NXJ, OVK, BPT, OB, BOS and W7OWX, in that order, between 12:25 and 1:35 p.m. HST; W5FRD and W5AQK were heard. Several of the W6s were running less than 10 watts input, and W6QXB was using a mobile set-up. Signals were heard as high as 51.84 Mc., and most of the stations were S9-plus. OA4BG worked W4QN, W4JEP, W8ZVY, W5EEX, W5FSC and W4GJO, and heard W9JMS, W5FRD, W5JLY, W5VY and XE1GE in a double opening which ran from 12:15 to 1:20 and 4:14 to 6:40 p.m. EST. HCJB, Quito, Ecuador was heard on 49.8 Mc. by many stations,

\* V.H.F. Editor, QST.



including W4EID, W2BYM and W9ALU. J9AAO heard W6UXN, 7:50 P.M. PST. Numerous contacts were made between W4s and W5s by E-layer rebound, all antennas pointing south.

13th: LU9EV, Buenos Aires, worked XE1KE and W5VY, the latter being the first contact between the United States and Argentina on 50 Mc. W8ZVY, Xenia, Ohio, is believed to have also worked LU9EV. Time: around 4 P.M. EST. ZS1P heard American commercial signals up to 43 Mc., mostly in W8. W4GJO worked OA4BG at 6:08 and 6:35 P.M. EST.

14th: MD5KW, Suez Canal Zone, worked ZS1P and VQ2PL, Northern Rhodesia, the latter on 28 Mc. ZS1P reported m.u.f. peak of 61 Mc. W5VY worked OA4BG at 3:25 and XE1KE at 4:30 P.M. CST.

XE1KE worked OA4BG, OA4AE, LU4DD, and LU6DO, and also W5VY who was audible only with XE1KE's array aimed at Argentina. Band open from 12:15 to 5:45 P.M. CST. Just before 8 A.M. a station was heard on 47.8 Mc. with his array aimed toward Africa. Station signed off in French at 8 A.M.

15th: ZS1P worked G5BY crossband and heard MD5KW working VQ2PL crossband. W6UXN heard ZK1AA, Raratonga, Cook Islands, at 7:12 P.M. PST.

16th: CE1AH worked PY2QK, Santos, Brazil. Band open all evening. ZS1T worked G6DH crossband.

17th: CE1AH worked J9AAO, new (and practically unbeatable) 50-Mc. record, 10,500 miles, 8:30 P.M. EST.

18th: Signals from European direction heard up to 49.8 Mc. in W1, around 9 A.M. EST. W4EID worked OA4AE, 4:30 P.M. EST.

19th: MD5KW worked G5BY, 0800 to 0830 GCT. MD5KW also heard by G6LK. ZS1T worked ZB2A, Gibraltar, crossband to 28 Mc. ZS1P worked PA0UN, who also heard ZS1AX. W4EID worked OA4AE, OA4BG and W5VY. W4GJO worked these and XE1KE, 11:15 A.M. to 5:20 P.M.

20th: W4FNR, W. Palm Beach, Fla., worked OA4AE and OA4BG, 5:41 to 5:57 P.M. EST.

21st: MD5KW heard an unidentified signal, believed to have been a G6, on 58 Mc. at 1330 GCT. G5BY heard MD5KW.

24th: Good sporadic-E opening, mainly W1, 2 and 4.

25th: G5BY heard W1HDQ, 9:00-9:04 A.M. EST.

26th: G5BY heard W1HDQ at 8 A.M., and worked the following crossband: W1LLL, W1CLS, W1HDQ, W2RGV, W2BYM, W2AMJ, W8RLT; heard W1CGY, W3CIR/1. G2BMZ worked W1CLS, W2BYM, W3CIR/1 crossband. G6DH heard W1HDQ. 50-Mc. reception of W stations by G5BY lasted from 8 to 10:15 A.M. EST. Signals very strong around 9 A.M. G5BY reported heard by W8RLT on 58.6 Mc.!

27th: G5BY heard W1HDQ at 7:30 A.M. EST; worked W1ATP, W1CLH, W8RLT, W3CIR/1, W1CLS, W2AMJ, W1HDQ; heard W2BYM. Test transmissions on 50.28, 50.4 and 51.1 Mc. by W1HDQ were copied by G5BY. Band open until 10:15 A.M. EST, with peak approximately 8:30 A.M.

28th: PA0UN worked W1HDQ, W1CLS, W1CGY and W3CIR/1, the first two-way trans-Atlantic 50-Mc. work, and heard VE1QZ and W2AMJ. Time: 7:30-9 A.M. EST. G5BY worked crossband, 28-50 Mc., W1CGY, W1PEA, W3CIR/1, W3OR, W2AMJ, VE1QZ, W8RLT, W8MVG, W3CGV, W1KCQ, W1KMZ/3, W1HDQ; heard W2BYM, W1CLS, W1LLL; band open from 7:15 to 10:30 A.M. G6DH heard W1CGY, W1HDQ, W1PEA, W1CLS, W3CIR/1, VE1QZ, W2AMJ and W2BYM, last signals being heard at 9:15 A.M. EST.

#### 50-Mc. DX — the HARD Way!

All the above constitutes only such parts of the story as have come to our attention; they are not all, by any means. And such prosaic reporting can carry little impression of the thrills which packed the month of October, 1947, as, almost daily, the 50-Mc. "firsts" were made. Outside of the United States, most of these 50-Mc. enthusiasts were working in the face of what we would consider to be insuperable difficulties, in the form of parts shortages, lack of check signals, and indifference on the part of a large portion of the amateur radio fraternity. That stations like CE1AH, PA0UN, the OAs, the ZSs, and many others, are on 50 Mc. today is a tribute to their energy and enthusiasm. May they be well repaid for their efforts!

It was not easy to put a 50-Mc. signal on the air in the little copper-mine town of Chuquicamata, Chile, for instance. Shipment of parts into Chile, always extremely slow, is now impossible. There is no such thing as aluminum tubing, which Ws so lightly scrounge from the local junk yards. And when you finally do get the nec-

Hilton L. O'Heffernan, G5BY, at the controls of the bank of converters used to cover 28 to 60 Mc. G5BY has had two-way contacts with 12 countries on 58.5 Mc., and 28-50 Mc. crossband QSOs with 4 others. His trans-Atlantic contacts include nearly 100 50-Mc. stations in 13 states and 4 Canadian provinces.

December 1947



essary gear together, what do you hear and work? Nothing, and lots of it, for weeks on end! You listen day and night, wondering whether you may not have missed that one "right" time, and finally, when it wasn't in the predictions at all, you hear a signal, and you make your first contacts! LUs and PYs are worked, via sporadic-E, and they tell you about the stuff they've been working, but you just don't hear it. Could it be the antenna? But how to tell, with no signals to be heard, except for occasional short session in the late evening?

You proposition G5BY, ZS1T, SU1HF and everybody you can get hold of on 10, to listen for you or transmit to you on 6, to no avail. Maybe 50-Mc. DX just won't come over those 18,000-foot Andes mountains! Then, one day, you snag J9AAO on 10 — now here's a fellow who's been going places on 50 Mc. How about a try on 6 — it's an impossible distance, of course — who ever heard of working halfway around the world on 50 Mc.? He's not enthusiastic, either; conditions aren't so hot today, but he'll stick on the automatic while he's off to help a fellow whose jeep



is stalled down the road. You snap the converter to the 50-Mc. position, and start to tune the band for the millionth time. Then — can it be? J9AAO! You yell at him for all you're worth on 10, and luck is with you! He's left the receiver on your frequency, and he chases back, leaving the jeep to start itself. You put the 50-Mc. rig on with trembling hands, give him a call and hold your breath, and back he comes — you're S3, on voice! It lasts only seven minutes, but those seven minutes pay you back for the months of effort you've put into the 50-Mc. band. You've done the impossible — beaten all previous records; practically doubled the best previous distance, and set a mark that is very apt to stand for all time! The 50-Mc. world has its hat off to you, Larry and Ida, CE1AH and CE1AJ — only those of us who have worked hard and long for our DX know how you feel!

And W7ACS/KH6 knows how you feel, too, for he was high on the list of those who have rolled up impressive totals of hours listening to background noise. He'd had his thrills, what with contacts with J9AAK and VK5KL, but they were awfully far apart. Then, that Sunday afternoon explosion, when a weak fading carrier, believed to be W5AQK, heralded the first opening to W-land! How those W6s fell over themselves when he signed with W7QAP, Tucson, Arizona, for the completion of the first W-KH6 QSO in v.h.f. history!

Things were not exactly calm in a few East Coast shacks on the mornings of the 26th, 27th and 28th, either. For several days running there had been evidence of rising m.u.f. on the North Atlantic route. Numerous signals were being heard, as high as 49.98 Mc. All the gang were lined up for a schedule which has now become standard practice in W1, 2 and 3. Whenever the m.u.f. begins to rise above 45 Mc. the Ws make 50-Mc. transmissions of five minutes' duration, on the hour and at 15-minute intervals thereafter, listening on 50 Mc. for replies for two minutes. If nothing is heard on 50 Mc., those who can do so listen on 28 Mc. for possible crossband contacts. With everyone crowding the low edge, such a program is a must, if anyone is to hear a European reply on 50 Mc. Cooperation has been excellent, and it is quite an experience to cut one's transmission a few seconds ahead, and hear the mass of c.w. sigs cut at almost precisely the same instant, while everyone digs for a sign of a signal from Europe. The first break came after the 7:30 transmission, the 28th, and your conductor's heart skipped a beat when the faint c.w. of PA0UN was heard calling — the first v.h.f. two-way across the Atlantic.

With G5BY on the job on 28 Mc. there has been no dearth of crossband contacts, Hilton working from Washington, D. C., to Halifax, N. S., and from Massachusetts to Michigan. Just when the band opens has not yet been determined, as G5BY has heard the first 50-Mc. transmissions made each morning, the earliest report to date being reception of W1CGY at 7:15 A.M. on the 28th, at which time the prediction charts for October place the m.u.f. for this path at about 28 Mc.! Thus far, the m.u.f. has favored G5BY whose location is the most southerly of any G, but his splendid gear and maze of antennas have done him no harm. His superb operating, knocking off the crossband contacts at almost a one-a-minute clip, has given many a W the thrill of a lifetime.

The m.u.f. barely reached 50 Mc. for G6DH, only 2 degrees farther north, on the 27th, and no signals were heard by PA0UN until the 28th. This is only the start, however, and the month of November promises many opportunities for European contacts, and possibly Africans as well. With MD5KW, SU1HF, VQ2PL, ZS6DW,

ZS6BT, ZS6JB, ZS1P, ZS1T, and many others on the job, we may be sure that not many chances will go astray.

Another goal which should not be forgotten is the 50-58 Mc. two-way with the Gs. Five-meter interest has developed to a high degree in the British Isles, and many Gs have receivers for 50 Mc. It is entirely possible that the m.u.f. may go high enough to permit them to get across to us in their band, at peak conditions, and we should pass up no chances to listen for their 5-meter signals. Already, the 58.6-Mc. transmission of G5BY has been reported heard by W8RLT, though only for a very brief interval, and extremely weak. Late November may well be a different story!

### 725 Miles on 144 Mc.!

October is usually considered to be past the peak of the year's tropospheric bending, but results on 144 Mc. this year don't bear out this idea. Perhaps it was the unseasonably warm weather which prevailed over much of October, but, in any case, 144-Mc. contacts were made over 300-, 400- and 500-mile distances so frequently that the boys are almost taking such things for granted!

The week-end of October 4th and 5th provided plenty of long-haul work in the East, and the log of W1BCN, Hyannis, Mass., for this period includes contacts with W4CYW, W4FJ and W4KAO, Richmond, W4CLY, Cape Henry, and W4IKZ, Lynnhaven, Va., all more than 450 miles distant. W4CYW and W4KAO were able to receive W1BCN on their horizontal arrays, despite Ed's vertical polarization. W1SF, Branford, Conn., worked these same stations, and VE1QY, Yarmouth, N. S., was having a field day with W1s and W2s. He was heard as far south as W3ASD, Crum Lynne, Penna.

W3GV, Erie, Penna., reports that on several different nights during October W9s in the vicinity of Chicago answered his calls, and short contacts resulted; nights which appeared to be not greatly out of the ordinary otherwise. Moral: never take it for granted that the band is dead — it *may* fool you! The 13th was a hot one in the Middle West, and W3QKI, Erie, lists W8BTL 310 miles, W9WOK 410 miles, W9WN, Chicago (vertical polarization, against W3QKI's horizontal), 395 miles, W9BBU 430 miles, W8AKR 300 miles, and W9AGV 475 miles, as part of a night's work running from 6:55 P.M. until 3:30 A.M. the following morning. W3GV worked most of these, and W9s LJV, LWE, BHV and numerous distant W8s, as well. The W8s up to about 350 miles were very strong on the 14th, but no W9s were heard in Erie. Stations in western New York were unusually strong, according to W2POM of Honeoye Falls.

The W9s must have been sailing over Erie on the 14th, for W2NLY, Plainfield, N. J., could

## RECORDS

### Two-Way Work

50 Mc.: CE1AH — J9AAO  
10,500 Miles — October 17, 1947  
144 Mc.: W3GV — W9WGZ  
660 Miles — September 18, 1947  
235 Mc.: W1CTW — W2HWW  
210 Miles — October 12, 1947  
420 Mc.: W6VIX/6 — W6ZRN/6  
186 Miles — July 27, 1947  
1215 Mc.: W3MLN/3 — W3HFW/3  
12.5 Miles — September 24, 1947  
2300 Mc.: W1JSM/1 — W1ILS/1  
66 Miles — October 5, 1947  
3300 Mc.: W6IFE/6 — W6ET/6  
150 Miles — October 5, 1947  
5250 Mc.: W2LCF/2 — W7QF/2  
31 Miles — December 2, 1945  
10,000 Mc.: W4HPJ/3 — W6IFE/3  
7.65 Miles — July 11, 1946  
21,000 Mc.: W1NVL/2 — W9SAD/2  
800 Feet — May 18, 1946

hardly believe his ears when, at 10:33 P.M., W9BBU broke through calling "CQ East." The signal was also heard by W2UM, Somerville, N. J. Needless to say, both stations called him, but no contact could be made. W2NLY was using the 24-element vertical array recently described by him in *QST*. W9BBU is, of course, horizontal. Would similar polarization at both ends have made possible a 725-mile two-way QSO? Maybe we will find out, when some good horizontal arrays are tried in the East.

Another East Coast opening came on October 22nd. W1JFF, Newport, R. I., began to hear W4IKZ as early as 8 P.M., followed shortly by W4CLY, and later by W4FJ. Contacts with the W4s were made by W1IZY, East Freetown, Mass., W1DAH, North Scituate, R. I., and W1QEX of Newport, as well as W1JFF. No weak or puny signals, either — Fred reports that the W4s were S9, indicating the possibility of much greater distances to be worked, as soon as the gang get started in North or South Carolina, Georgia, or Florida. On the basis of experience to date, there appears little doubt that even Nova Scotia to Bermuda is not at all impossible on 144 Mc. Let's go, Florida W4s!

### 235-Mc. Record Moves East

For some time, W1CTW and other stations in the Boston area have been hearing the powerful 235-Mc. signal of W2HWW, Little Silver, N. J., on good nights, but no contact could be made until October 12th, when W2HWW heard W1CTW, peaking S9 and fading to S2, at 10:06 P.M. Also worked by W2HWW was W1DAH, North Scituate, R. I. Before the record-breaking QSO, W1CTW and W1DAH were in contact on

(Continued on page 136)



# Correspondence From Members-

The Publishers of *QST* assume no responsibility for statements made herein by correspondents.

## HAM SPIRIT

15 Cambria St., So. Beach, S. I., N. Y.

Editor, *QST*:

I've been laid up since January of this year, with a long-term illness, and my only pastime is ham radio. Well, about a month ago I happened to mention to W3NHB the fact that my receiver was about to quit on me, and I wouldn't be able to maintain our daily skeds (the receiver was an All-Star donated by W2KKW); whereupon W3NHB got together with the following hams and raised enough funds to purchase a BC-312 which I am using now, and which does an excellent job: W3FFF, W3NIM, W3LYW, W3NHR, W3NHU, W3LMB, W3KZR and W3MTQ.

Many thanks to all these great guys, who have proved to me that such a thing as "ham spirit" still exists.

— John A. Chiuchio, W2LWB

430 Magnolia Ave., Millbrae, Calif.

Editor, *QST*:

On September 15th I landed in New York after spending a 6 weeks vacation in Sweden. Since then I have been telling all of my "buddy spark-chasers" about the warm reception that the SMs gave me. But they deserve better than word-of-mouth recognition for their hospitality and display of ham brotherhood.

On August 14th, both I and W1AKY, that kw. op. from south of Boston, were guests of honor at a dinner in Stockholm given by Sweden's organization, the *Sveriges Sändare-amatörer*. W1AKY had had the pleasure of QSOs and schedules with a majority of those present. His stay was climaxed with meeting most of his QSO comrades and by being interviewed over Swedish radio. Special thanks for a very swell visit are due SM5WJ, Ivar Westerlund of Stockholm, treasurer of the S.S.A., SM7FB of Klippan, and SM5SI, president of the S.S.A. Perhaps an injustice has been done Swedish amateurs, in that, despite the fact that they are very active with Stateside and European contacts, and have a good many ARRL members, they are too seldom heard of in *QST*. They deserve recognition as being among the fellows that have made amateur radio what it is today.

— Warren Hayward, W6WDA

## HURRICANE EMERGENCY

P.O. Box 237, Durham, North Carolina

Editor, *QST*:

The hurricane and flood conditions along the South-eastern and Gulf coasts have provided another opportunity for ham radio to prove its worth to the general public. Already favorable comment on the help being provided by amateurs has been heard over the broadcast facilities of this sector.

Despite the efforts and cooperation of most hams there were a few who begrudged relinquishing their pet frequencies so that emergency traffic might be carried on and they were too often heard to gripe about it over the air. In many cases clear channels other than those prescribed by the FCC were requested since the originating station in the stricken area did not have crystals for the prescribed emergency frequencies.

— James W. Bosford, W4MFK, ex-W2PYM

## COMMERCIALS IN OUR BANDS

83 Whitmarsh Avenue, Worcester 6, Mass.

Editor, *QST*:

A *QST* correspondent recently complained of the number of commercial stations operating in the amateur bands, with special reference to the twenty-meter band where he found the commercials "lined up shoulder-to-shoulder after midnight."

Before reporting these fellows to the FCC it might be a good idea to check our receivers to make sure that the image rejection is all that it should be. There are plenty of powerful commercials in the vicinity of 13 to 13.5 Mc.

In line with the above it should also be noted that with certain antenna combinations it is possible to adjust the antenna-compensating condenser of almost any popular communications receiver so that the input circuit will be tuned to the image frequency. Under these conditions the image rejection will be poor and the twenty-meter band will certainly sound as though the commercials were lined up shoulder-to-shoulder.

— Harold A. Larson, W1JE

## FREQUENCY-TIME BAND DIVISION

120 Greenwich Street, New York 6, N. Y.

Editor, *QST*:

Perhaps you and the gang at large may be interested in one of the staggering results of "W10U's" exposition of the staggering band theorem published in April *QST*. It "rapped" with sufficient violence to raise a question in my mind. Oh, horrible thought! What if the scheme "W10U" has proposed, half in fun, may provide a practical way out of some of our present difficulties with that old c.w.-'phone argument in particular, and QRM in general?

Just what is wrong with time division of our band occupancy for 'phone and c.w., plus appropriate simplified frequency subdivision which we have used for many years? Inasmuch as a clock and a calendar are necessary equipment in keeping our station logs, why not utilize time division if it will help us? Like every problem that has a large number of unknown factors, a thorough test is better than months of hypothetical discussion.

Therefore, let us try Rapp's basic idea soon in a nationwide experiment, including all U. S. amateurs, for a sixty-day period. We can ask FCC for a trial of such a plan, with regulations automatically returning to their present status at the end of the trial period. We can then evaluate the results individually, and take a nation-wide poll for a consensus. Then we will have facts instead of theories to guide us, enabling us to decide to abandon the idea completely, or return to it in its original or modified form. The latter is likely to be the case, as it is practically impossible to guess correctly on all of the factors the first time you try such a complex experiment.

I suggest that a time-sharing plan be confined to 80, 40, 20 and 10 meters, all changes from 'phone to c.w. on these bands to take place daily at 3:30 A.M. CST. Considering the country as a whole, from the population, time-zone and DX-activity angles, our activities are at a minimum at this time. Another basic consideration is that regardless of the fact that 'phone is assigned to a subband, c.w. operation will be permitted simultaneously in such 'phone bands. This

(Continued on page 180)





# Operating News



F. E. HANDY, WIBDI, Communications Mgr.  
J. A. MOSKEY, WIJMY, Asst. Comm. Mgr.  
ALBERT HAYES, WIJIN, Natl. Emerg. Coordinator

GEORGE HART, WINJM, Communications Asst.  
A. F. HILL, JR., WIQMI, Communications Asst.  
LILLIAN M. SALTER, Communications Asst.

**V.H.F. Sweepstakes.** As you receive this issue, the sounds of the familiar battle cry of the All-Section Sweepstakes are just dying away. The "SS" is an annual ARRL affair. While open to workers on all bands, it is natural that h.f. instead of v.h.f. frequencies are used, as best suited to the DX desired. A *V.H.F. Sweepstakes* with rules somewhat paraphrasing those of the regular SS is being announced in next *QST* for the week-end of January 17th-18th. It is hoped that this will give the "extra" incentive to scores of hams who normally practise v.h.f. work only as a side line to try for new QSOs and sections using 50 Mc., 144 Mc., and above. It might be a good idea to take a tip from "The World Above 50 Mc." and modify some of your v.h.f. equipment for quick change-over to c.w. or m.c.w. . . . for sure identification and ability to QSO the stations at extreme ranges in the coming ARRL V.H.F. Sweepstakes.

**Emergency Lessons.** A detailed story of the public-service communications work of amateurs in the path of the hurricane which crossed Florida and wreaked havoc in Mississippi and Louisiana appears elsewhere in this issue. We're darned proud of the communications assistance that amateurs and amateur organization were able to render!

FCC designated some 37 amateur policing-observing stations in the course of its special orders for declaring the emergency and specifying cleared frequencies under §12.156 of the amateur-service regulations. Preparedness and *advance organization* played a greater rôle than ever before in amateur communications work. Numerous reports from the designated monitor-observers and amateurs participating emphasized, however, some of the same lessons we cited in *QST* of last July! Here are five points to heed — all hams please note.

1) Every active licensee should *join* the ARRL Emergency Corps. The Supporting Division, AEC, is available to all amateurs who concur in the ARRL plan for assisting agencies and individuals in communications emergencies by familiarizing themselves with details so they are "a ready reserve." Full membership in the AEC is for all amateurs who can be consistently active in tests and local group organizations. You, and every U.S. and Canadian amateur *not* now an

AEC member, are invited to send a card or message for the application form.

2) On suspicion of the development of an emergency communications situation all amateurs should make it a rule to *curtail* all operation and *listen*. If in a known critical area, offer your services to your EC.

3) All networks, 'phone or c.w., alerted by emergency coordinators or NCS, local or regional, should appoint member-station monitors not engaged in normal circuit work to observe and assist in keeping clear the frequencies of any stations with actual emergency traffic.

4) Amateurs should *not* attempt to solicit or handle individual inquiries into an emergency area until an appropriate time after any circuits set up have cleared their first-important emergency traffic for agencies and officials — traffic concerning the welfare of all within the affected area.

5) Each amateur and designated policing-observing station should review or reread FCC regulations, §12.156; also monitor WIAW's frequencies in each band to keep personally informed of the purport of new FCC orders, over-all organizational requests originating within the emergency areas concerning needed activities, and spot emergency-operating precautions.

**Long-Term AEC Objectives.** In addition to the above, seven additional requirements have been bulletined throughout the ARRL field organization. All these matters are receiving implementation by ARRL emergency coordinators. It is requested that recommendations of clubs and individuals be sent to SCMs and SECs for appointment of qualified emergency leaders (ARRL emergency coordinators) in every town and city where no amateur-service leadership is presently active.

1) Lists of all available near-by amateur operators, stations and coordinators must be at hand in the planning and setting-up phase at the inception of any emergency.

2) Frequency, equipment dispositions, tie-ins between bands, tentative routings, all should be indicated in advance plans and tests. (Each EC develops amateur radio *community* plans.)

3) All communicators should be trained in the duties they will be called on to perform — telephone manning, c.w. and 'phone procedure, net

## William Henry Matchett, W1KKS 1916-1947

"BM" of W1AW was known to thousands of amateurs. Licensed as W1KKS in 1936, later on acquiring Class A, few amateurs have shown such



enthusiasm for radio, such singleness of purpose and devotion to duty and ideals. A lively fellow, Bill and his motorcycle (CONN 73) were familiar visitors at many a ham shack hundreds of miles from Hartford. His death on October 20th as a result of a motorcycle accident came

as a shock to his many friends and associates. Our personal grief at his passing will be shared by scores of amateurs who knew him. Born in Manchester, Connecticut, Bill Matchett graduated from Manchester High in 1937. He was a charter member of the Manchester Radio Club, rallying always to its support on ARRL Field Days and other projects. W1KKS earned a Public Service Certificate for work following the New England Hurricane ('38). RCC, ORS, A-1 operator, Official Observer, he also held WAS and a 35 w.p.m. Code Proficiency Certificate.

In early 1942 "BM" became a radio operator in FCC's Radio Intelligence Division. In '45 he was given a letter "for loyal and diligent service, for his high proficiency in making intercepts, for direction finding and related duties." Following this contribution to the war effort, Bill acquired a commercial ticket, shipping on the tanker SS *Mission Santa Ynez* to Europe and the Pacific. In '46 he returned to his home city, but soon accepted the invitation to go north with Commander MacMillan in his first postwar cruise with the schooner *Bowdoin*, KLPO (see page 75, September, '46, *QST*). On his return he took an ARRL post as attendant at W1AW, where he often worked many hours past his watch just to engage in hamming. Bill asked no higher honor of life than the privilege of giving hams cherished contact with W1AW.

and record traffic practices, phonetics, installation.

4) Especially is self-training required in the handling of messages. Rules for priority, concise phrasing, getting signatures of agencies and persons (for responsibility), setting down complete addresses and preambles and notation of full handling data as receipts are given, are all very necessary. True familiarity is best achieved by practical experience. *Writing down* communications accurately takes amateur know-how.

5) When amateur groups are organized as a communications team to go into a disaster zone, or even in their own community, those selected should handle *their own* equipment, if possible.

6) The critical importance of message centers and their operating personnel needs greater recognition in community plans.

7) Emergency radio nets must be kept clear of interference when community safety and requirements are ahead of individual needs.

**On C.W. Operation.** W4PL writes, "I could tell in two or three words if the man calling me had traffic experience. QTC 1 GULFPORT QSP? . . . HR NR 1 W2XYZ . . . TNX QRU VA. The ham *without* traffic experience wandered around the subject, explained how worried the senders were, how much they would appreciate the favor, filed messages with sketchy preamble, faulty address, long checks, repeated names, explained that the parties were relatives of the addressee (the message was signed Mother and Dad), and often as not offered hopefully to QRX while I relayed and got an answer. . . . Co-operation from QRMers was good. Not one of hundreds gave me the slightest argument. Those with most savvy emitted *tnx sri* and vanished. Others created a little more QRM while explaining how much regret they felt, but all got off and stayed off. . . . A few figured that if they wanted to express a wish to help, that *made* it emergency traffic. I heard enough crummy VFOs tuned on 7155 kc. to last me a long time. Wish more hams would understand 'he also serves, who only sits and waits.'"

**On 'Phone Operation.** W4BAZ writes, ". . . voice technique employed could stand plenty of improvement. . . . One station in Miami Beach had a conscientious operator who was not too sharp as to traffic-handling methods. For instance, on *every* transmission he would repeat calls in great detail instead of using break-in. A lot of valuable time was wasted by not taking advantage of FCC provisions permitting break-in and ten-minute identification. Why not suggest that these boys all spend a few hours listening to snappy airline (or any equivalent amateur-net) procedure? Too many 'phone operators only appearing essential on the air seemed poorly motivated by the desire to see their names in print. There was one W3 on the Florida emergency frequency bragging to all and sundry how many hours he had spent on the air aiding. If he

was a sample of the assistance, I pity the poor people in the stricken area."

W8WXG (Ohio EC) advises that capitalizing on the emergency-net experiences, arrangements have been made for extra receivers and c.w. monitors to be kept on W1AW's as well as local net frequencies at all times during any future emergency to get the latest information accurately as of the moment of the first transmission. There were eight separate W1AW bulletins bearing on the emergency and over 50 repeats at required intervals, to keep all amateurs advised.

—F.E.H.

### FLORIDA STORM EMERGENCY

At 4:20 P.M. on October 11th information received from the Miami office of the U. S. Weather Bureau indicated that a tropical storm of possible hurricane force would strike the west coast of Florida in the Fort Myers area. Acting upon this information, A. Litschauer, W4JQ, SEC for Western Florida, alerted the 3rd District of the Florida Emergency Phone Net. At 6:00 P.M. all districts of the net were activated and, with W4PB as NCS, the gang on 3910 kc. included W4CQZ, W4PT, W4LJM, W4AFO, W4JKI, W4BB, W4IVX, W4NN, W4DU, W4GUJ, K4NR/4, W4AOK, W4WS, W4CPG, W4FWZ, W4GJI, W4ES and W4AKI. The task of clearing 3910 kc. was assigned to W4CVQ, W4DU and W4NN, and it is reported that amateurs in the Southeastern area coöperated readily.

By 8:00 P.M. the 3675-kc. c.w. net swung into operation with W4DQW acting as NCS, and W4CQW, W4IQV, W4LCZ, W4AYV, W4AAK, W4GOG, W4BYF, W4FWI, K4NR, W4GEI, W4AKV, W4IWM and W4FWZ in attendance.

Since this storm was not as serious as had been expected the volume of traffic handled by these nets was comparatively light when compared with the September hurricane, but the relaying of weather information and the handling of traffic to and from the Red Cross throughout the state provided plenty of action for the gang.

The emergency was declared over at 2:10 A.M. EST on October 12th by the Miami Weather Bureau, but most of the net stations stood watch until 6:00 A.M. as a security measure.

### "OPERATING NEWS" INVITATION

The Communications Department is always interested in hearing about what you are doing in amateur operating. The Operating News columns are devoted to passing along to you items on every phase of operating interest. Send us information on operating events and activities, stories, briefs, oddities. All articles and items will be welcomed and will receive consideration for appropriate use. If something occurs in your operating that seems worthy of note, let us pass it along to the gang.

### YL WAS

The Young Ladies' Radio League offers a certificate to any licensed amateur who qualifies for its YL Worked All States Award. The following rules are a revision of those published in February *QST*. Note that the "postwar" stipulation has been removed as a result of many requests.

1) All licensed amateur radio operators, OM or YL, are eligible.

2) All contacts must be with licensed women amateur radio operators, although not necessarily with members of the YLRL.

3) Confirmation of two-way contact (QSL cards) by amateur radio with all of the 48 states in the U. S. must be submitted to Lou Littlefield, W1MCW, 19 State Avenue, Queen Acres, Cape Elizabeth, Maine.

4) Contacts must have been made from the same location or within a reasonable distance in one city or residential area.

5) Return postage must be submitted for return of QSL cards and the YLRL will not be responsible in case of loss or damage to cards submitted.

### CODE-PROFICIENCY PROGRAM

Special W1AW transmissions are made once each month to enable you to qualify for a Code Proficiency Certificate at a speed of 15, 20, 25, 30 or 35 w.p.m. If your initial qualification is for a speed below 35 w.p.m., you may later try for endorsement stickers indicating progress above the first certified speed. The next qualifying run will be made on December 16th at 10:00 P.M. These W1AW transmissions are made simultaneously on 3555, 7145, 14,150, 28,060 and 52,000 kc.

Code-practice material is transmitted each night, Monday through Friday, at 10:00 P.M. EST. Tuesday and Thursday transmissions are made at speeds of 15 through 35 w.p.m. in 5-w.p.m. steps. On Monday, Wednesday and Friday practice is at 9, 12, 18, 25 and 35 w.p.m. References to texts used on several of the practice runs appear below. These make it possible to check your copy. To get sending practice hook up your own key and buzzer and attempt to send in step with the W1AW automatic transmissions.

Date	Subject of Practice Text from October <i>QST</i> :
Dec. 2nd:	<i>Exit Heterodyne QRM</i> , p. 13
Dec. 4th:	<i>Atlantic City Report</i> , p. 17
Dec. 10th:	<i>The "Twin-Lamp"</i> , p. 22
Dec. 12th:	<i>A "Halo" for Six Meters</i> , p. 24
Dec. 15th:	<i>A Pretuned Bandpass Frequency Multiplier</i> , p. 29
Dec. 16th:	Qualifying Run, 10:00 P.M. EST
Dec. 18th:	<i>A Compact and Inexpensive Superhet for 144 Mc.</i> , p. 33
Dec. 23rd:	<i>Element Spacing in 3-Element Beams</i> , p. 37
Dec. 26th:	<i>Come Aboard, OMI</i> , p. 44
Dec. 29th:	<i>Using Selenium Rectifiers</i> , p. 50

## BRASS POUNDERS LEAGUE

(September Traffic)

Call	Orig.	Del.	Rel.	Extra Del.	
				Credit	Total
W4PL	13	126	1619	122	1880
W5KTE	311	319	360	200	1190
W4IQV	12	43	898	40	993
W6PIV	3	23	708	21	755
W6JN/6	703	2	2	—	707
W6REB	2	25	504	25	556
W5MN	4	105	318	105	532

The following make the BPL with over 100 "deliveries plus extra delivery credits":

W5JHS 234  
W8SAY 182

W4GOG 160  
W0QXO 134

A message total of 500 or more, or 100 "deliveries plus extra delivery credits," will put you in line for a place in the BPL. The Brass Pounders League listing is open to all operators who qualify for this monthly "honor roll."

## TRAFFIC TOPICS

Mimeographed copies of the directory of active nets are now available from Headquarters. Drop a postcard or radiogram and as many copies as you wish will be forwarded. Net registrations are coming in regularly and the directory will be revised as necessary. A bulletin is contemplated, giving routing information for overseas traffic. Announcement will be made when it is available.

The Louisiana Section Net advises it connects directly with the Rebel Net. The net is meeting Monday through Friday on 3635 kc.

The Tall Corn Net is open for business five nights a week, Monday through Friday. The net covers Iowa and operates at 6:45 P.M. CST on 3560 kc. Iowa stations are invited to participate, and anyone interested should contact Bob Evans, W0AUL.

The Washington State Net is now operating on 3695 kc. at 7:15 P.M. PST five nights a week, Monday through Friday. The net gives statewide coverage, and has good outside schedules.

Word received from Ray Jensen, W6REB, NCS Pioneer Net, indicates that traffic for Pacific Islands and westbound overseas may be routed via Pioneer Net, which will see that it reaches proper West Coast transmission points.

Eastern Massachusetts Net is in operation on 3745 kc. on a five-day schedule, Monday through Friday. The net meets at 7:00 P.M. EST, and all Eastern Massachusetts stations are cordially invited to attend.

Atlantic-Pacific Trunk Line is in full swing with cross-country schedules, New Jersey to California. The net meets at 9:30 P.M. EST, Monday through Friday, on 3630 kc.

## A-1 OPERATOR CLUB

It is a pleasure to announce the following additions to the ARRL A-1 Operator Club roster: W1IIN KKS QMI VG. W2ANW AYN BZJ DQB FXN HZY IOP JB LBM LFR LRW NKD OXX SKV TYU. W3ALX CPV EKK FLH GHD GJY NDG QP. W4HYW IA MS WT. W5KTE. W6AOA GHU PIV. W7BED KIY. W8NKK SCW. W9NH NUF SRN TLT. W0LLN. VE6GD 7AM 7HP. CR9AG FASBG G2PL G2YY G6ZO G8KP KH6IJ KL7AD KL7AF KS4AC VK2EO. This list and previous lists which appeared in January *QST* (page 70) and the June issue (page 76) constitute a complete roster of A-1 Operator Club members. If you were the prewar holder of an A-1 certificate and your call has not appeared in any of the postwar listings thus far published, please drop a line to the Communications Department and your call will be added to the active list.

The A-1 Operator Club is dedicated to good operating. Every amateur should strive to make his operating merit nomination. Follow standard operating practice, observe the rules of good 'phone operating and clean keying and you may be pleasantly surprised some day to receive a certificate. Those who already are members should keep on the lookout for candidates and nominate every amateur deserving of the A-1 distinction. The complete Club rules appeared in January *QST*.

## W4PL, Shepherd, Tennessee

Here's the station of an amateur who needs no introduction in traffic circles. For many years W4PL has been one of the outstanding message-handling stations in the United States. Operator Ben White is Tennessee RM and net-control station of the Hit and Bounce Net. Long-haul traffic is his specialty. He holds a Public Service Certificate for work during the 1937 Mississippi Valley Flood and rendered valuable assistance in the September Gulf Coast hurricane. Ben also holds ORS, WAS and WAC, is a member of the A-1 Operator Club and RCC, and a regular in the BPL list.

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## DX CENTURY CLUB AWARDS

DXCC certificates based on postwar contacts with 100-or-more countries have been made to the amateurs listed below. The countries-worked totals indicated have been certified by examination of written evidence under the award rules as published in March 1947 QST.

### HONOR ROLL

W1FH.....179	W1CH.....141
W8HGW.....151	W8RDZ.....136
W2BNA.....144	W1TW.....136
W3BES.....144	W2GWE.....131
W4BPD.....143	W6VFR.....130

### NEW MEMBERS

W3JNN.....118	W3EVW.....104
W3DPA.....117	W9RBI.....104
W4CYU.....117	W8FJN.....103
W0YXO.....110	W4MR.....102
ZS6DW.....109	W4PN.....101
W3EPV.....109	LA7Y.....101
W3KT.....108	W8NBK.....100
W3LNE.....106	W0GKS.....100
W9DUY.....105	W0NUC.....100
W5FNA.....105	

### ENDORSEMENTS

W4AIT.....122	W2QKS.....120
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### RADIOTELEPHONE

W1FH.....123	W8LO/2.....100
W1HKK.....106	W1JCX.....100
W4CYU.....106	

## MEET THE SCMs

Paul M. Bossoletti, W0GZD, the North Dakota SCM, first became interested in amateur radio in 1935 and received his license in 1938, at which time he was issued the call W9GZD. Besides his Class A amateur ticket, Paul also holds first-class commercial radiophone and radiotelegraph licenses.



He is at present a senior in electrical engineering at the University of North Dakota, from which he expects to receive his B.S. degree in 1948. In addition he works forty-five hours a week at K1LO as transmitter engineer. Paul previously attended North Dakota State School of Science and Camp Claiborne (La.) Radio School.

An ex-serviceman, he served in the Southwest Pacific with Hq.

Co. Radio Section, 164th Infantry, North Dakota National Guard.

The main transmitter in W0GZD's basement shack consists of a Meissner Signal Shifter driving 807 buffer-doublers and p.p. 809s final at 250 watts; modulator is a pair of 807s. A second rig

with a 6E6 ECO driving a pair of 1625s at 100 watts is on hand for c.w. operation. All bands from 3.5- to 50-Mc. 'phone and c.w. are covered; those most used are 7- and 14-Mc. c.w. and 14- and 28-Mc. 'phone. Receiver is an RME-45 with preselector. Antennas include a 14-Mc. ground-plane vertical, a beam and folded dipole for 28 Mc., and a 3.5-Mc. Zepp-fed full-wave for 3.5 and 7 Mc.

SCM Bossoletti participates actively in most ARRL operating activities, particularly the Sweepstakes and CD Parties. He holds membership in the Forx Radio Amateur Club (he is newly-elected president) and the University of North Dakota Radio Club, is an active OBS and ORS, holds a 35-w.p.m. Code Proficiency Certificate, and has handled considerable flood emergency traffic.

Interests other than amateur radio include a home workshop and his family of two children. In the sports field Paul's favorites are hunting, fishing, softball and volleyball.

## MISSISSIPPI RIVER FLOOD EMERGENCY

More than a nodding acquaintance with a Mississippi River flood began for the Egyptian Radio Club, of Granite City, Ill., on June 26th when Alternate Director Jansen, W9DJG, and Jim Adamson, W9THB, were called to the Engineers Flood Control Headquarters at Mitchell, Ill., and asked if the Egyptian Radio Club could set up for emergency operation as the Mississippi and the Missouri rivers were expected to crest at an all-time high. On that afternoon the group proceeded to get equipment assembled, and by midnight the set-up was in operation. The ERC clubhouse was used as a base of operations until all rigs had been assembled and tested. When the word was circulated that the dikes were about to break, the exodus from the clubhouse was on and two truckloads of equipment were removed before the water forced the members to take to the roof.

The equipment in use by the group when set up for QRR operations comprised mostly transceivers on 144-Mc., and 807 finals on 28-Mc. The club remained on duty for more than twelve hours and has been commended by both the War Department and the Corps of Engineers as well as several local business-service organizations. The great majority of the traffic handled comprised official requests for the dispatching of equipment and emergency flood-control supplies from one point to another in the threatened area as flood conditions changed from minute to minute.

The following are among those known to have participated: W9CQE, W9DZU, W9FOI, W9GNO, W9NBA, W9NTL, W9NVW, W9QPV, W9THB, W9TSS, W9USX, W9WQV, W0NKS, W0NKK, W0NXT, W0QKE, W0RCE, W0YRX, R. Gantcheff, G. Gantcheff, J. Lile.

## A.R.R.L. ACTIVITIES CALENDAR

Dec. 16th: CP Qualifying Run  
 Jan. 17th: V.H.F. Sweepstakes  
 Jan. 19th: CP Qualifying Run  
 Jan. 23rd: Frequency-Measuring Test  
 Jan. 24th-25th: ARRL-Member Party  
 Feb. 13th-16th: DX Competition (c.w.)  
 Feb. 19th: CP Qualifying Run  
 Feb. 20th-23rd: DX Competition ('phone)  
 Mar. 12th-15th: DX Competition (c.w.)  
 Mar. 17th: CP Qualifying Run  
 Mar. 19th-22nd: DX Competition ('phone)  
 Apr. 13th, May 14th: CP Qualifying Runs  
 June 12th-13th: ARRL Field Day

Jan. 16th-Dec. 15th: 1947 V.H.F. Marathon

Jan. 1st-Dec. 31st: Most-States V.H.F. Contest

First Saturday night each month: ARRL Officials Nite (Get-together for SCMs, RMs, SECs, ECs, PAMs, Hq. Staff, Directors, Alt. and Asst. Dirs.)

## SCORES, V.H.F. RELAY AND QSO PARTY

V.h.f. enthusiasts had their own special week-end competition last May when a relay and QSO party was open only to stations operating on bands above 30 Mc. Though participation was not up to the prewar level or similar activities, the gang accepted the opportunity to try their hand at relaying messages and chalked up numerous contacts as a result of the increased activity stimulated by the contest. It is of interest to note that every single one of the contestants whose scores are listed below used the 144-Mc. band. VE3BNG topped the score list by taking advantage of both the band and portable multipliers. W1DHX, Fall River, Mass., who said he was "not competing because of low power at my station," made 79 contacts for the highest QSO total.

Another special competition for the v.h.f. group is scheduled for January 17th-18th. Plan now to take part in the First V.H.F. Sweepstakes that week-end!

(Figures represent score and number of different stations worked. Letters indicate band or bands used: A for 50, B for 144 and C for 235 Mc.)

VE3BNG	840-46-ABC	W6LDJ/6	141-21-B
W3MHW/3	488-45-B	W7JPN	124-13-AB
W6KD/6	402-39-B	W3HC	106-12-AB
W3LZD/3 <sup>1</sup>	400-29-B	W1OPC	102-33-B
W7PJS/7	312- 6-AB	W1MGL	82-25-B
W1DHX	229-79-B	W7SP	78- 9-AB
W1HDQ	224-30-AB	W1LYE	54-25-B
W1PCJ	216-38-B	W7JFB	50- 4-AB
W6HZ	188-28-AB	W4FJ	42- 6-AB
W1IQZ	184-63-B	W9KCW <sup>2</sup>	35- 8-B
W1PIV	174-46-B	W3AWS	24- 6-B
W2DZA	172-23-BC	W9UIN	15- 2-B
W9PK	158-17-AB	W2DOG	6- 3-B

<sup>1</sup> Two operators, W3LZD, W3MRQ.

<sup>2</sup> Two operators, W9BUK, W9KCW.

## ELECTION NOTICE

(To all ARRL Members residing in the Sections listed below:)

You are hereby notified that an election for Section Communications Manager is about to be held in your respective Sections. This notice supersedes previous notices.

Nominating petitions are solicited. The signatures of five or more ARRL full members of the Section concerned, in good standing, are required on each petition. No member shall sign more than one petition.

Each candidate for Section Communications Manager must have been a licensed amateur for at least two years and similarly a full member of the League for at least one continuous year immediately prior to his nomination.

Petitions must be in West Hartford, Conn., on or before noon on the closing dates specified. In cases where no valid nominating petitions were received in response to previous notices, the closing dates are set ahead to the dates given herewith. The complete name, address, and station call of the candidate should be included with the petition. It is advisable that eight or ten full-member signatures be obtained, since on checking names against Headquarters files, with no time to return invalid petitions for additions, a petition may be found invalid by reason of expiring memberships, individual signers uncertain or ignorant of their membership status, etc.

The following nomination form is suggested:

Communications Manager, ARRL (Place and date)  
 38 La Salle Road, West Hartford, Conn.

We, the undersigned full members of the .....  
 ..... ARRL Section of the .....  
 Division, hereby nominate .....  
 as candidate for Section Communications Manager for this  
 Section for the next two-year term of office.

Elections will take place immediately after the closing dates specified for receipt of nominating petitions. The ballots mailed from Headquarters to full members will list in alphabetical sequence the names of all eligible candidates.

You are urged to take the initiative and file nominating petitions immediately. This is your opportunity to put the man of your choice in office.

— F. E. Handy, Communications Manager

Section	Closing Date	SCM	Present Term Ends
Maritime*	Dec. 15, 1947	Arthur M. Crowell	.....
West Indies	Dec. 15, 1947	Mario de la Torre	Deceased
Manitoba*	Dec. 15, 1947	A. W. Morley	Resigned
New Hampshire	Dec. 15, 1947	John H. Stoughton	Resigned
Washington	Dec. 15, 1947	Laurence M. Sebring	Resigned
Philippines	Dec. 15, 1947	George L. Rickard	Oct. 15, 1938
San Joaquin Valley	Jan. 2, 1948	James F. Wakefield	Jan. 15, 1948
Los Angeles	Jan. 2, 1948	Ben W. Onstenk	Jan. 15, 1948
South Dakota	Jan. 2, 1948	P. H. Schultz	Jan. 15, 1948
Alaska	Jan. 2, 1948	August G. Hiebert	Jan. 15, 1948
Georgia	Jan. 2, 1948	Thomas M. Moss	Jan. 16, 1948
San Francisco	Feb. 2, 1948	Samuel C. Van Liew	Feb. 15, 1948
Connecticut	Feb. 2, 1948	Edmund R. Fraser	Feb. 15, 1948
Santa Clara Valley	Feb. 2, 1948	Roy E. Pinkham	Feb. 15, 1948
West Virginia	Feb. 2, 1948	Donald B. Morris	Feb. 15, 1948

\* In Canadian Sections nominating petitions for Section Managers must be addressed to Canadian General Manager Alex Reid, 169 Logan Ave., St. Lambert, Quebec. To be valid such petitions must be filed with him on or before the closing dates named.

## ELECTION RESULTS

Valid petitions nominating a single candidate as Section Manager were filed in a number of Sections, as provided in our Constitution and By-Laws, electing the following officials, the term of office starting on the date given.

Kentucky	W. C. Alcock, W4CDA	Oct. 15, 1947
New Mexico	Lawrence R. Walsh, W5SMA	Oct. 15, 1947

## Kon-Tiki Communications – Well Done!

**T**HE most unusual expedition ever to place reliance on amateur radio for communication departed from Callao, Peru, last April 28th. Known as Expedition Kon-Tiki, a group of Scandinavian scientists set sail in a 45-foot balsalog raft of primitive construction. It was the theory of Thor Heyerdahl, Norwegian ethnologist and leader of the venture, that the settlement of the Pacific Islands resulted from a migration of American peoples who had sailed there many hundreds of years ago, rather than a trek from Asia as claimed by other scientists. To prove that such a migration was possible, Mr. Heyerdahl decided to attempt the trip in a raft of the type preserved in Inca legends and early Spanish historical accounts. He named the expedition in honor of the ancient pre-Inca sun god. Secondary objective of the undertaking was to make any observations during the voyage that could be useful to science.

The Kon-Tiki raft was fashioned of logs of the lightest wood in existence and lashed together with native-made hemp rope. Its only sources of locomotion would be the Pacific trade winds and the Humboldt Current which sweeps northward along the west coast of South America and thence in the direction of the Tuomotu Archipelago.

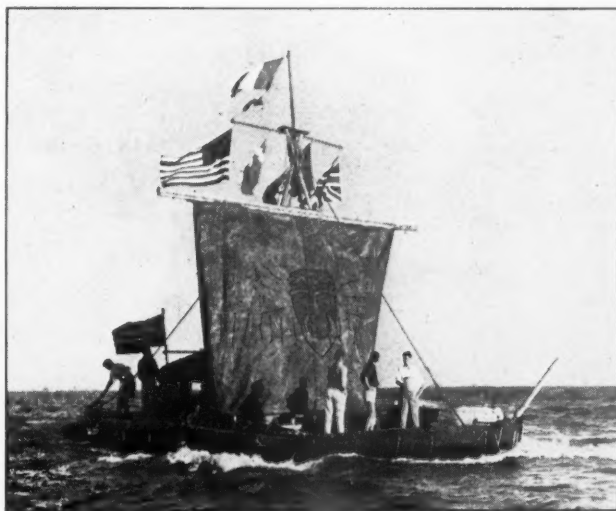
Needless to say, Kon-Tiki faced countless dangers. Amateur radio can feel flattered that it was asked to assist in such an unusual undertaking. In late 1946 ARRL was approached by Captain Bjorn A. Rorholt, LA1GA, Assistant Military Attaché on the Norwegian Embassy staff in Washington, who requested amateur cooperation. LA1GA had received the assignment of organizing radio communications for the expedition. He had worked out a communication plan which entailed use of normal marine channels for emergency purposes and the 7-, 14-, 28- and 50-Mc. bands for contacts with amateurs. Authority had been received for Kon-Tiki to use the call LI2B. After numerous discussions of amateur requirements, ARRL alerted a group of amateurs to

assist. The following were among those initially selected: W3ECP, W3FNG, W3LVY, W3YA, W6CIS, W6RBQ, W6WB, KH6DD.

The expedition carried two radio operators without previous amateur experience, Torstein Raaby and Knut Haugland. Both were eminently well qualified to go along on such a hazardous voyage. The former operated clandestine radio stations from occupied Norway during World War II, sent vital information to England and received instructions for the Norwegian underground. He also took part as radio operator in the action that resulted in total destruction of Germany's production and stock of heavy water, essential in atomic-energy research. Raaby, as the radio operator of a special intelligence unit under British command, transmitted to England from Norway essential information about the

German battleship *Tirpitz* which ultimately led to her sinking by British bombers.

The conditions under which the radio equipment aboard the raft was to operate presented many unusual problems. Proximity of the craft's deck to the sea and the relatively small protection afforded by the thatched bamboo cabin meant that the gear would have



to withstand the effects of moisture. It was desired to have transmitter units light and tight enough so that if they should fall overboard they could be fished out and put to work again immediately. Operation was required on maritime as well as amateur frequencies. Both 'phone and c.w. were specified. The transmitters were to be tuned, closed up and remain watertight unless something went wrong. It must be possible to load them up on antennas of whatever length could be erected on available supports. With these requirements in mind, W1CTW and W1EHT of the National Company engineering staff designed and constructed the needed rigs. One transmitter was built to operate on 7 and 14 Mc., another for 28 Mc. and a third for 50 Mc. The circuit for the 7-14 Mc. rig was taken

(Continued on page 142)

SCM AEC ORS CP SEC OBS TLS OO  
**Station Activities**  
 OBS AIOPR EC DXCC CLUBS RM OPS RCC

• All operating amateurs are invited to report to the SCM on the first of each month, covering station activities for the preceding month. Radio Club news is also desired by SCMs for inclusion in these columns. The addresses of all SCMs will be found on page 6.

### ATLANTIC DIVISION

**EASTERN PENNSYLVANIA** — SCM, Jerry Mathis, W3BES — Eastern Pennsylvania radio clubs are doing a thriving business. The York Road Radio Club held a spirited auction presided over by HIO. The club's transmitter hunts are well received. The West Philadelphia ARA elected an entirely new batch of officers: COZ, pres.; Ed Tuller, vice-pres.; MDE, secy.-treas.; and TTP, custodian, elected for a five-year term. FPC says that the Midnight Net invites all to join on 28,746 kc. KZ is increasing power and is going to try for a Class A ticket. KBH has a new 28-Mc. four-element plumber's delight working out in fine style. JLE says that 28-Mc. is open for extreme DX early in the morning and late at night. Our condolences to ELI who spent two weeks in the hospital. GEW has a new jr. operator whose initials are the same as his call — G.E.W.! AQN is getting a thrill out of handling DX traffic. NNV has a BC-610 on a four-element wide-spaced beam. Active Eastern Pennsylvania Net stations are: ELI, GMK, HCT, OML, QEW, QV, VMF, and YA. The following Scranton stations are crystal on 144 Mc.: LKL, QEW, OST, QGE, and SM. Vacations cut into CAU's OO work a bit this month. The Eastern Pennsylvania Net needs more members. Contact GMK for assignment. DZ likes to work his DX on 7 Mc. 6GAC now is in this section with the call 3AXA, which he held in 1930. ASW is back with us again after a long siege of illness. We hope to hear him buzzing around the 3.5-Mc. band as in days of yore. FLH is proud of his new DXCC Certificate. BXE has applied for his. GHD has qualified for his WAAP and BERTA. BES has 145 countries confirmed to date. GYV has a new Elinor three-element 28-Mc. beam with a homemade two-element 14-Mc. job hung on the same frame. It does a fine job along with his kw. final. FUF is building a new exciter for all-band bandswitching operation. GHD got one of those new Silver frequency multiplier units. There is plenty of interesting activity, so please advise your SCM about it. Traffic: W3QEW 68, HCT 18, AQN 16, ELI 15, EAN 6, GMK 5, CAU 4, DZ 4, OML 4, BXE 3, BES 2, ITZ 2, DUU 1, INN 1.

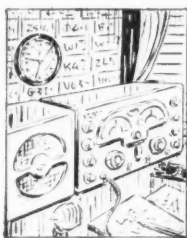
**MARYLAND-DELAWARE-DISTRICT OF COLUMBIA** — SCM, Eppa W. Darne, W3BWT — The Delaware Amateur Radio Club meets the first Tuesday of each month in the Chamber of Commerce Rooms, Mullin Bldg., Wilmington, at 8:00 p.m. The Argument Radio Club's September meeting was held at the home of GKT, Milford, Del. The following officers were elected: BSV, pres.; DOG, vice-pres.; NIH, secy.-treas. The Washington Radio Club's first September meeting was conducted by Vice-President MO and featured an illustrated talk, "Electronics and the V2 Rockets," by C. H. Smith, Naval Research Laboratory, Washington, D. C. The second September meeting was devoted to "GCA" Blind Landing System with movies and a talk by Lt. G. T. White, LTR. The Potomac-Rappahannock Valley Emergency Net continues its splendid work and drills regularly. A number of section members did splendid work during the recent hurricane in Florida and Louisiana, maintaining communications between these areas and Washington. Especially brilliant was the work performed by EIS and ECP for the Red Cross and the railroads in the disaster areas. Others actively participating were AJZ, HN, USA, AKB, BWT, and BKZ. The Section Net resumed operations on Oct. 1 at 7:30 p.m., using frequency of 3650 kc. with ISF as NCS and AKB as Asst. NCS. For the present, the net operates Monday, Wednesday, and Friday. All ORS and

other section stations are urged to participate in the net, affording each an opportunity to brush up on handling traffic. Our net connects with the main ARRL Trunk Lines affording reliable relay routes for any messages our net members desire to originate, and makes for the speedy delivery of messages routed into our net. Join in this worthwhile section activity. EYX has had considerable antenna trouble but we hope he will be back on soon. PV now is OK after a recent severe illness. FRD is on 7-Mc. c.w. and 14- and 28-Mc. 'phone using 75 watts. IET has c.w. and 'phone on five bands and gets out well. BTQ was married during the summer. NNK and NSC are newly-licensed Delaware stations. DRD grabbed off Zone 23 with C8YR. GAU did likewise and added AC4BR. DPA has worked 154 countries. EFZ has worked 42 countries within a short time since coming back on. ECP visited ARRL Headquarters and attended Hudson Division Convention. He also increased his power to 250 watts. KDP now has worked 101 countries. AM keeps regular schedules on 14-Mc. 'phone with KG6AV/VK9. DZZ has new four-element wide-spaced 28-Mc. beam that works FB. The Baltimore Amateur Radio Communication Society held a meeting Oct. 6th in the auditorium of b.c. station WCBM, at which the following officers were installed: JVI, pres.; VP, vice-pres.; MUU, secy.; and LUE, treas. FUV, BHQ, LO, EQK, HWH, LZJ, BII, KKH, and JCI are members of the various committees. At the Oct. 6th meeting LO spoke on "Antennas for the Ultra High Frequencies." 2MMO/MM, of Norwood, N. J., who operates 14,300- to 14,335-kc. 'phone while traveling about the world on the S. S. *Clifford Ashby*, visited Baltimore recently. EQK has 57 countries to his credit, all worked on 14-Mc. 'phone, the last one being UA1AB, Leningrad, Russia. Traffic: W3KHJ 60, ECP 50, AJZ 49, KBX 17, EIS 15, AKB 14, BWT 11, EFZ 6, AKR 2, JKO 2, MSK 2.

**SOUTHERN NEW JERSEY** — SCM, George W. Tunnell, W2OXX — CFB and HAZ are suffering from blown power transformers. HX reports the 75-meter 'Phone Net now meets Sundays at 9 a.m. and Wednesdays at 7 p.m. The Hunterdon County gang is working hard on its emergency set-up with SAK as Emergency Coordinator. The club offers a free crystal to all new hams (members only). RNI reports trouble with his break-in system. RPH, SNK, ZI, and OXX are acting as tie-in stations with various ORS nets. BEI reported in person, thereby increasing his extra delivery total. ORS is hunting a Trunk Line vacancy. RG is hard at work with the 3700-kc. traffic net but would like more of you to "report in" since only ten have shown up thus far. Ex-3HUR moved to Merchantville and awaits a new call. SJRA will elect new officers Dec. 17th. PAU and GCU are editors of their club newspapers, *SJRA News* and *Scuttlebutte*, respectively. UKS is active again. SPN is Vineland traffic outlet. VQC is a new ham. SAI has new QTH and a rhombic. RGV suggests a 50-Mc. net. PPO reports that EL's beam is ready to go up. VX is on 7-Mc. c.w. and is teaching his son the code. Emergency Coordinators are needed in the following counties: Atlantic, Burlington, Camden, Cape May, Cumberland, Gloucester, Morris, Salem, Sussex, and Warren. Traffic: W2SXX 37, RG 22, OXX 19, ORS 11, BEI 6, RPH 6, HAZ 5, HX 5, ZI 2.

**WESTERN PENNSYLVANIA** — SCM, Ernest J. Hlinsky, W3KWL — Another 144-Mc. DX record and congratulations to Biley, GV. Also sharing honors are KQI, LTN, and AU. MMH, Erie, is proud of five-element wide-spaced beam. MMI and LJF also are sporting beams. RHK and KQB are repairing blown-down beams. The Erie County Emergency Net has five active members with crystal-controlled rigs, and expect sixteen members will report for activity during the winter. VHP is using BC-610 with 65-ft. high three-element beam. QN is now EC for Erie. In Altoona, KFD and LJQ are seeking ORS appointments. KQD reports 144-Mc. activity now totals 13 stations. SCR-522s can be found at MBB, LJQ, NIK, KFD, RFM, VPF, FER, KQD, and MYN. A 144-Mc. prize is being offered by MBB and KQD for the best station activities and DX on 144 Mc. through club activity manager's contest rules for club members only. LJS and VPF will graduate from Milvale Radio School in N. Y. C. TXQ is no longer





LIKE the amateur to whom "a db is a db" we, too, once figured that a db of R. F. gain should be the same as a db of antenna gain. But not so to the engineer. For a long time they have referenced power levels in db and voltage levels in db, and also measured signal to noise ratio in db. It would appear that even these wise men got fooled in that they decided on the bel and then found it should have been only one-tenth as big -- a decibel. However, be that as it may, some of these new

antennas for micro waves look like bells, and the engineers say they have lots of decibels, but maybe there isn't any connection.

Anyway, some engineer in the dim past sitting in the shade of a "zombie" finally wised up as to one case where a db is not a db, or vice versa. It seems this wise man's thoughts had to do with antennas and R.F. gain and more particularly as to which would give him the most for his money, so that he would have more money for something else. (Another Zombie maybe!)

Without going further into the life of our imaginary engineer we would like to give you some of the pertinent data of one case where a db is not a db. True enough, as far as gain goes, a db of R.F. gain is the same as a db of antenna gain, but not so with signal to noise ratio decibels.

To be more specific, if we have a Receiver with an R.F. stage and add a similar R.F. stage the improvement in signal to noise ratio in decibels will probably be very much less than the gain of the R.F. stage in decibels. This is, of course, because the R.F. tube noise and circuit noise are usually the main limiting factors on signal to noise ratio and are roughly the same at the grid of either R.F. stage. There is, usually, some improvement in signal to noise ratio because of the replacement of the relatively noisy mixer by a more quiet R.F. tube in the second stage.

The other side of the story is that roughly the same random noise power is obtained from either a dipole or a beam antenna, unless the directional antenna is pointed at a source of man made noise. This means, however, that in general, the noise power is roughly the same for any antenna and if the desired signal is acted upon by the antenna gain, the signal to noise ratio is improved roughly the same number of decibels as the antenna gain in decibels.

The improvement in signal to noise ratio is what counts in working DX and this indicates that the decibels of antenna gain are much to be preferred over the same number of decibels of R.F. gain, because of the greater improvement in signal to noise ratio resulting from antenna gain. Here we see a db is not always a db. The added R.F. stage will, of course, improve the image rejection.

This all adds up to the answer that even though good receivers are available for the amateur, a good antenna is still needed to drag in the DX and compete with the fellows who are using both good receivers and good antennas.

RALPH S. HAWKINS



"wofling." He now is married. Congratulations. In the Pittsburgh area we find AVY resigning as Section Emergency Coordinator. Sorry to lose you, Francis. Thanks for a job well done. AER still is hooking 'em on 14-Mc. c.w. CKO and MPO are reported as candidates for Division Director. KXU is using BC-221 as VFO. UVD reports receiver trouble. Jeannette now has a new radio society known as the Wesco Amateur Radio Society. Meetings are held in YMCA, Greensburg. Election of officers will be held at the next meeting. MOT is moving to new QTH. KWA was heard routing traffic on 3.5 Mc. LFM is now at school in Florida. LIM has dual 28-14-Mc. beam. NJW is new station in Wellersburg. My apologies for an error in stating that LWN was traveling 1600 miles down south. It was MLN, chief operator at State College, who made the trip and he still insists he found no antennas in 2600 miles of traveling. The W.Pa. ORS Net now is underway on 3750 kc. daily at 6:30 p.m. The Mercer County Radio Association will hold its annual election. Traffic: (Aug.) W3MLN 3. (Sept.) W3AER 32, KWL 31, GJY 12, KWA 10, KQD 3, LFM 3 MOT 2.

### CENTRAL DIVISION

ILLINOIS—SCM, Wesley E. Marriner, W9AND—SXL is back on the air at new QTH. When not DXing, NDA is rag-chewing. FRP reports via radiogram through FKL LNI and TAL built VFOs from surplus TU5-B tuning units. SYZ is Chicago outlet for ARRL Trunk Line "J." BUK has been rebuilding-consolidating power supplies. AEI is interested in joining the Emergency Corps. OFP, in charge of emergency work in Quad City area, reports forming the Quad City Ten Meter 'Phone Net, with 16 on the roll call, 8 mobile and 8 fixed. Iowa RM, 9HMM will be the 3.5-Mc. c.w. outlet and later there will be several portable units on 3.5-Mc. c.w. and 3.85-Mc. 'phone. The Quad City Club meets the 2nd Tuesday of each month. WDD attended his first hamfest at Nameoki. He is active on 7 Mc. and hopes soon to be on 14 Mc. A new club is the River Park Junior Amateurs Radio Club, sponsored by CQY. It is for young radio operators of teen age and meets at 5100 N. Francisco, the 2nd and 4th Mon. of each month. At the seventh meeting in 1947 of the Chicago Area Radio Club Council, Mr. Fritz Franke of the Illinois Ham Club told of plans for a big Hobby Show in Chicago Nov. 1st to 8th. HQH is active on 29,160-kc. 'phone and expects to be on 7 and 3.5 Mc. again soon. EBX, in St. Louis area, is looking for traffic schedules between 6:30 and 10 p.m. BRX has been having a bout with hay fever and asthma. JTX now has VFO and 200 watts on 3.5, 7, and 14 Mc. FIN has been quite ill but is up and around again. UPW has been ill. SYZ is on 144 Mc. with 522A rig. Chicago Area AEC furnished radio communication for Boy Scout Jamboree at Soldiers Field for American Red Cross, Sept. 27th. EC FXB was in charge. Walkie-talkies were used in the stands and were loaned by the Chicago Area V.H.F. Club. YTV says, "See you in the next CD Contest." DBO still is on 14 Mc. EVJ is getting set for a big winter traffic set-up. From HPG we learn that the Chicago Radio Traffic Association, now in its 24th year, elected the following officers at its annual meeting Sept. 18th: KLH, pres.; BAN, vice-pres.; HPG, secy.; AYL, treas. KA and HPG participated in ARRL FMT. BAN is doing mobile work with IBT, and HPG is doing the same for Commonwealth Edison. ARF is back with NBC in Chicago. The Chicago Area Radio Club Council now has 14 member clubs and will have two booth spaces at the Hobby Show. From TZQ we learn that the Lake County Radio Club is progressing satisfactorily with quite a bit of activity on all bands. TZQ purchased a 348 receiver and a 522 outfit. AEP is new in Sterling. GBT is getting equipment in order. HOC will soon have a 522 on the air. The Starved Rock Club met at NGG in Pontiac for a picnic lunch at Chautauqua Park and a visit at WQPP. On the way home they stopped in to visit BSG. JVC and JAU joined the National Guard. VOQ is putting the big rig on the air. ZHB will soon have another tower up. 7NGD will soon be on the air again from Dixon. GNU is waiting for new 14-Mc. beam to be delivered. AWA and AND went surplus crazy. HQG picked up AND and ZHB and went to RME in Peoria. He visited CSZ and RGH. ERU and KOK both have enough pasteboards for DXCC membership. ZRB has KP-81 receiver and plans to move 144-Mc. job from courthouse-top to his home. An application is needed from every county for Emergency Coordinator. OBS, ORS, OPS, and OOs are needed. Send in your new DX total each month. DX: ERU 127, KOK 125, AND 97, AWA 86, TAL 51. Traffic: (Aug.) W9NDA 9.

(Sept.) W9JTX 55, EVJ 26, BGC 25, AND 20, SYZ 16, FKI 10, TAL 6, WDD 6, FIN 4, SXL 2, FRP 1, YTV 1.

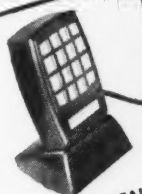
INDIANA—SCM, Ted K. Clifton, W9SWH—New OBS are PRO and UGH. TZD is off the air because of heart trouble. New officers of the Fort Wayne Radio Club are: IDZ, pres.; Harry Nelson, vice-pres.; and VDB, secy-treas. The club held a picnic supper Sept. 14th at Bixler Lake. SNQ is new ORS from Portland. DRH, of Peru, has an HT-9 transmitter with 165 watts input and is using a 7-Mc. Zepp and a Sky Champion receiver. OK, at Jasper, has 150 watts on 14, 7, and 3.5 Mc. ENJ is married and living in Monterey Park, Calif. PTW is on 14-Mc. 'phone with 90 watts to a single 807. Dick also works 14-Mc. c.w. and has a new end-fire array which helps squirt those signals east and west. YB has a new six-element broadside array on 14 Mc. The antenna is about 180 feet above ground. GTL is back in New Haven after five years in Indianapolis. The TARS members and their families gathered at Camp Pahoka on the Wabash River near Mt. Vernon on Sept. 20th. About eighty persons attended with thirty-five ham calls booked as present. UIA won the left foot code-sending contest. His XYL won the prize in the rolling pin throwing contest. DGA is leading the TARS contest with over 100 cards. UNT is using his XYL's clothesline on 3.5-Mc. c.w. GFO is using a four-element wide-spaced rotary with a kw. input. Bob worked 6QUT, Amos of "Amos and Andy." JEU has cut his input to the rig because of an increase in the family. WNM had CO2CK as a visitor. GZT schedules LQE on c.w. each week. HQF, ex-8CNL, now located at Newburg, is using the old rig consisting of a 203A to work DX on 7 Mc. Allen has started a hobby class in radio. BBN moved to Evansville from New Albany. FCS has transferred his OO appointment from Minnesota. CQH and ZJO have Klystrons operating on 13 cm. TT will be the Indiana station on TL "J." AB lost his 144-Mc. antenna during a storm and was QRT for one month. Your SCM will have a new QTH by the time you read the above. Please note the change in address when mailing your reports. Traffic: W9FCS 54, RCB 43, MKM 16, SNQ 8, TT 7, SWH 6, SRN 3.

WISCONSIN—SCM, Reno W. Goetsch, W9RQM—IQW again is active on State traffic net, and has renewed ORS appointment. In addition to doing a swell job as EC at Racine, SZL is holding a post on TL "J" providing the Wisconsin outlet on this north-south traffic route. State traffic net, 3775 kc., is off to a good start for the season with LFK as NCS. DKH is using exciter stages to work 3.5 Mc. SIZ is back at school in Stevens Point with an HRO as the latest addition to his station. HDJ, CWZ, BCC, and SIZ let off a lot of steam in a recent four-way round table which lasted almost four hours. CWZ is pounding brass in Stevens Point and is planning on net operation, as is BCC. YCV moved to Milwaukee. AFT, as OES, reports that results with the new six-element beam and 829B final on 144 Mc. are FB. CIH's monthly OO report includes a list of off-frequency notices sent. CXR is back on 4-Mc. 'phone after a summer of fishing. EWC is on a fishing trip in Canada. KBU received his BS Ph.D. from the Institute of Paper Chemistry. VMZ is working for WJPG-f.m. at Green Bay. Kaukauna is well represented on 4-Mc. 'phone by MSJ. SZL, Racine EC, and FZC, Wausau EC, participated in National Emergency Test. The Racine Megacycle Club had an FB attendance at their picnic. Old-timers like AGX, BIO, and GGN are becoming active again. TKI, HHM, and SOW are Class A. PPP is getting out on 28 Mc. with 50 watts and "V" beams. The NWRC held its annual banquet at Eau Claire, with Central Division Director, ARE as guest speaker. RRA is rebuilding with plans for 100 watts. PMS is a new call in Wausau. BXM has resumed activity at Owen. Applications for appointment as ORS, OPS, OES, OBS, OO, etc., are invited. Traffic: W9CIH 27, LFK 23, SZL 20, RQM 15, DKH 10, MUM 9, SIZ 6, YCV 5, LED 2, IQW 1.

### DAKOTA DIVISION

NORTH DAKOTA—SCM, Paul M. Bossaletti, W0GZD—Congrats to LHS, big winner of the Hallcrafters Expedition! ZKU heads Minot CAA. GWM built 807 rig. AIU, new Minot call, is on 28 Mc. with beam. RBS, Bismarck, is knocking off 28-Mc. DX with new four-element beam. OCI put up 3.5-Mc. antenna. JPW got VHF-152. GNS, UAP, ZKL, and AJH/mobile on 28 Mc. at Minot. WFO, Park River, is n.f.m. on 3.85 Mc. 'phone. Secondary EC in Fargo is CAQ. VAZ is rebuilding. CDO represents Sharon on 3.85 Mc. SWC will be on c.w. soon. AFK corresponds for Minot area. GZD is constantly stringing anten-

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915	Crystal	-50	60-7500	7 1/2 ft.	\$10.00
915-S*	Crystal	-50	60-7500	7 1/2 ft.	11.50
615	Dynamic	-57	55-7500	7 1/2 ft.	16.50
615-S*	Dynamic	-57	55-7500	7 1/2 ft.	18.00
615-SR**	Dynamic	-57	55-7500	7 1/2 ft.	20.00
215	Carbon	-26†	200-4000	48 in.	8.25
215-S*	Carbon	-26†	200-4000	48 in.	9.75
215-SR**	Carbon	-26†	200-4000	48 in.	10.00

\*with slide-to-talk shorting switch

\*\*with slide-to-talk relay control switch and hang-up hook  
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nus. DAO is back in Forx. The Bismarek gang is planning 50- and 144-Mc. work. WBY's medical studies conflict with hammin'. EOZ is on 3.85 Mc. when in Jamestown. Ridgeway is on from KSJB transmitter. NVK is working on n.f.m. Write for dope on North Dakota nets and join one! C.U. on 3.5-Mc. c.w. Traffic: W0GGD 11.

**SOUTH DAKOTA** — SCM, P. H. Schultz, W0QVY — GKU is new president of the Sioux Falls Club with RRN, secretary. GLK and VOD hold similar jobs in Pierre Club. MZJ has added another harmonic to his family. QVY visited ex-PLF at Buffalo, N. Y. WUU is active in State net and is playing with f.m. job, portable-mobile. 6ZRR is new call of Ernie Johnson, ex-9QAK, of Northville. He is at San Luis Obispo, Calif., and wants South Dakota contacts. 3KVV is new engineer for KGFX at Pierre. BJH and CEG are new hams at Winner. The South Dakota Net is beginning to take shape with GCP, WUU, UVL, SAT, OLB, FAX, and BLK as starters. BLK is new Dakota Division Alternate Director. Congrats are due him. Drop him a few lines. Now for ADJ for Director. What say, gang? WLP is retiring from Highway Commission after nearly thirty years of service. Traffic: W0GCP 14.

**MINNESOTA** — SCM, Walter G. Hasskamp, W0CWB — 6HJP/0 is "California Kilowattling" with a pair of 250THs on 14-Mc. c.w. from the Army at the U. of M. VUV's new QTH is Waseca. RJF is giving his rig a complete overhaul with the help of DAK. Walt Hagen, RM3c USN, has new ticket with call DDH. Upon discharge in November or January he will be at Rochester. FAH keeps daily schedules with ARH and 9SBR and for a new ORS has a fine traffic total. Our RM, RPT, has the MSN going on 3.5 Mc. now. How about as many as possible reporting as often as possible on 3795 kc. at 7:00 p.m.? Our PAM, JIE, has started the Minnesota 'Phone Net rolling again. Where and when? 3900 kc. at 6:30 p.m. The Rochester boys plan much v.h.f. work and the purchase of a 144-Mc. transceiver for emergency work. RPT and CYA attended North Iowa Hamfest. JDC will be at the U. of M. this season. ORJ has a pair of 8005s in his new final. IPX and YUU are working on a grounded grid preselector for 28 Mc. KQA has a new NC240-D. YKD is working at KLIZ. During the hurricane when skip put an end to communications between Gulf Port and New Orleans, an associated press message was relayed to Memphis. EPJ, of Spring Park, stepped in and relayed between Memphis and New Orleans. The Arrowhead Radio Amateurs of Duluth and vicinity held a picnic meeting Aug. 31st at Enger Park, Duluth. Thirty-three hams and their families were present along with five mobile 28-Mc. stations. Operated by GKP and HQW, a hidden station was set up in the "point of rock" district. GKP used his low power, battery-operated 'phone transmitter in the 27-Mc. band and used a tone signal for the mobile stations to locate. Voice announcements were made at appropriate intervals. HQW listened on the 28-Mc. band with his battery operated SW-3. After about one hour the hidden station was found by YUP using his regular mobile gear. Telescoping his receiving aerial as he came nearer the hidden transmitter, he finally came upon the boys in the nick of time, rescuing them from a soaking rain. Traffic: W0FAH 44, RPT 25, RJF 4, EPJ 3, CWB 2, YBM 2, CLU 1, GFA 1.

### DELTA DIVISION

**ARKANSAS** — SCM, Marshall Riggs, W5JIC — FMF has been appointed ORS and is very active in traffic work. LZQ is on 7 Mc. with low power. DRW is on again after a lapse of ten years, using p.p. 813s. DYF, another who has just gotten back on after being absent a long time, is running 8005s in final with NC-240D receiver. BAB is on again with p.p. 813s after being absent many years. MRD, LUX, JIC, and MIN are active on 3.5-Mc. c.w. We have two nets: 'phone 3885 kc., NCS EA; c.w. 3788 kc., NCS AQF. Both nets were active in recent hurricane. LUY is OBS on 7145 kc. with 400 watts to p.p. 812s. Traffic: W5AQF 32, EA 30, LRE 12, JMZ 6, JIC 5, DSW 4, JAP 4, IIV 3.

**LOUISIANA** — SCM, W. J. Wilkinson, jr., W5VT — CEW is PAM. KTE is SEC. The RM appointment is vacant. We can use a good live-wire RM, so if you are interested in traffic let the SCM hear from you and we'll see if we can get a good Pelican Net lined up to work in conjunction with the Rebel Net. KTE, HHT, YU, QJ, KYC, KTG, KTK, DLA, JHS, ANP, HAV, GIA, LDH, IKJ, HKJ, LN, KU, QH, ABA, BSI, IJJ, and HBY are among those known to have performed splendidly during the

hurricane emergency. Sorry we do not have a complete list but many failed to report. Thanks to all for a job well done. LQV has been handling some traffic and is doing his share in organizing a radio club at Centenary College. WN has 200 watts on 28-Mc. 'phone and 40 watts on 3.5-Mc. c.w. KUG has moved to Florida and we hope he will get in on the net. GHF comes through with some dope and a nice traffic report. MFT is on 7 and 28 Mc. HOU lost his antenna in the big blow. ASJ sends his 73 to the gang from aboard the SS *Charles Draper*, in dock at San Juan, P. R. USN (USNR in NOLA) was active during the emergency also. KUW says he also put in his two cents worth. GND and MPK are handling occasional traffic. CGC is on 3.5, 7, and 28 Mc. these days. Wanted: Applications for ORS, OPS, OBS, and OO appointment. We are in need of good ECs in most localities, including Alexandria and Baton Rouge. Have you noticed the data on your appointment certificates? Some have expired and should be renewed at once. Traffic: W5KTE 1190, GHF 117, VT 102, LQV 14.

**MISSISSIPPI** — SCM, Harold Day, W5IGW — PAM: HKJ, RM: WZ. Credit to the Hattiesburg and the Gulfport Clubs for a job well done during the Gulf Coast emergency. New ECs are: HKJ, LN, DLA, LAK, and ANP. HEF is running an 813 final. KHB is playing with plenty of DX on 28 Mc. JUJ has a mobile job on 28 Mc. IGD is on 7- and 3.5-Mc. c.w. HEK is running 500 watts on 28 Mc. HEJ is back on the Rebel Net with 500 watts and a new receiver. HKJ is new PAM. NIU is running 50 watts on 7-Mc. c.w. DEJ, DNS, DNV, DNW, CUU, and JYB each have purchased a Mackay radio transmitter (Surplus) using an 813 final. WZ is back with the Rebels as Alternate NCS. LAK now has 49 countries on his DX list. LSG is on 7 Mc. running 25 watts. KUT now is Class A. Amateurs having emergency equipment are urged to join the Mississippi section of the Tri-State Emergency Net. Contact HKJ, WZ, or myself. More ECs are needed. Traffic: W5WZ 36, LAK 23, DEJ 19, LN 4.

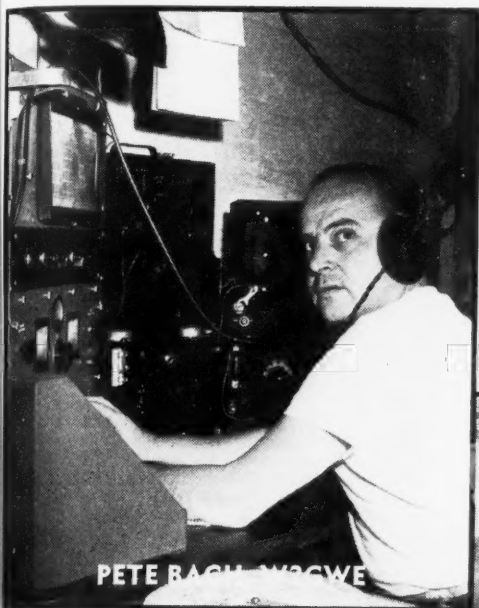
**TENNESSEE** — SCM, James W. Watkins, W4FLS — LQE, FYQ, and HOM are experimenting on 112 Mc. BBL is constructing a super-duper 28-14-Mc. all-aluminum beam. FQI is back on 28 and 14 Mc. BXG reports contact with J8ACS, Korea. KYB has a 14-Mc. rhombic and made 27 consecutive DX contacts during one week end. All interested in a c.w. net should contact Harold E. Walchli, TWI, 144 Waddell Circle. PL is sporting three new transmitters, all Federal FT-102s. Your SCM and QT visited the Nashville Club. BBM, the Delta Division Director, was guest speaker at a luncheon meeting. AWB is on 14-Mc. 'phone. AXD is coming back with a pair of 809s. AAW has a new mobile rig on 28 Mc. GYL is on 3.85 Mc. and has a new VFO. HOJ worked his first DX in fifteen years of operating, a G3 on 14 Mc. HUB is working toward a DX Century Club Award on 14-Mc. c.w. ILZ is active on 3.85 Mc. and is alternate net control station for the Tennessee 75-meter 'phone net; ERJ is net control. This net meets on 3980 kc. every Sunday at 9 A.M. BEG has a 28-Mc. mobile rig. HHC again is active on 3.85 Mc. LCB has a new Globe Trotter rig on 28 Mc. KH is on 28 and 27 Mc. GXX has a 28-Mc. mobile converted and working again. HRS keeps schedule with VO2N on 28 Mc. EBBQ is on 3.85 Mc. QT is building a new kw. rig. MGW expects to operate on 28-7-, and 3.5-Mc. c.w. with 40 watts to an 807. JD and PGJ are on 3.85 Mc. with a new Collins 30-K. Traffic: W4PL 1880, ILZ 111, FWH 14, GHL 10, FLS 6.

### GREAT LAKES DIVISION

**KENTUCKY** — SCM, Joseph P. Colvin, W5IEZ 4 — (Reported by W4BAZ). CMP built VFO out of a TU5B. After blowing two transmitters, EDV is using Navy gear. IXN is back on the air. JHU is back on KYP. JQY is new KYP member. JTO works 28-, 14-, and 3.5-Mc. 'phone and has new beam. HCD is trying various 28-Mc. antennas. KQI is trying 28-Mc. mobile. IPR tries for DX on 14 Mc. ITC laid down the mike for transit. KRY threw away a pair of 813s for a pair of 807s to duel TUT. YPR now has local company on 3.5-Mc. c.w. MLW. MFQ is 27-Mc. tiend. VP, JEB, KFI, KMX, MEY, and MRF, visited the Indianapolis Radio Club as the guests of 9WUC. FBJ is building ½-kw. for real DX on 14-Mc. c.w. KFH is working lots of DX on 28-Mc. c.w. KMJ, KFI, KMX, KFH, KLP, LXP, and MRF attended the Cincy gathering. OGY, LVL, HMN, JEB, and JXK are working 28-Mc. 'phone. OIC tries for DX on 28 Mc. MEH gets traffic on 7 Mc. BEW has new Collins 30K-1, dual 14-28-Mc. beam and 40' steel tower. The Herrington Lake Hamfest, sponsored by the



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Lexington Radio Club, was attended by KMX, KFI, KFE, KMJ, MFI, MIS, TXC, KQI, MRF, LXP, and IQL. KFE is working 3.5-Mc. c.w. and 28-Mc. 'phone. AZY is going hot on 14-Mc. c.w. KKK and FR are working 28-Mc. 'phone mobile. BAZ is organizing TL "J" again. JQV is working 3.5-Mc. 'phone late at night. PKX is director of Tri-State Radio Club. LLR is building kw. rig. KYN operates on 3810 kc. 9:30 P.M. CST Monday, Wednesday, and Friday. KYP operates at 7 A.M. CST daily on 3955 kc.

**MICHIGAN** — SCM, Joseph R. Beljan, jr., W8SCW — SEC: SAY. The QMN nets got off to a flying start Oct. 1st and the interest shown promises to make this a banner year for QMN. We are running three directed nets, Monday through Friday, at 5, 6, and 7 P.M. UKV is net manager of the 5 P.M. net, NOH the 6, and SCW the 7. Join in the fun and report into the net of your liking and convenience. Congrats to the Grand Rapids Club on affiliation with the ARRL. The Edison Radio Amateurs' Assn. elected the following: LLP, pres.; EMP, vice-pres.; OXQ, secy.-treas.; AW, act. mgr. UKV is new RM. AQA, ex-YJU, is new EC for the Grand Rapids area. WFA is EC for the Detroit area while ZHB is taking care of the Lewiston area. Paul had a nice write-up in the local paper. GP is again putting on code practice for beginners at 6, 9, and 12 w.p.m., Mondays and Fridays at 8:30 P.M. on 3663 kc. VAY is new ham at Battle Creek. ZUL is regular reporter from U.P. on the QMN. OCC completed his new 200-watt rig and the three-element beam is all set to go up. UGR is building new e.c.o. BCX is prospective ORS. RLT worked Okinawa on 50 Mc. SWF is first Detroit to own a Collins 70-A receiver. With deep regret we report the passing of 9PDE from Ishpeming. CSI is building new rotary beam for 28 and 14 Mc. YOO received his second-class commercial radiotelegraph ticket. YLA is rebuilding buffer and final. ZJK is again active after the summer letdown. WKK is building new beam. RZS has Navy TDE rig on the air. ZNO and his XYL, KDX, attended the tennis tournament at New York. Congrats to WEL on the arrival of the jr. operator and to WOV on the new YL addition. CPY finally hoisted that new antenna. UJE is looking for Africa for his WAC. UJE is proudly twisting the dials on his new NC-173. NXB is back on 28 and 50 Mc. and has high praise for his R-9er. SOE finished up the new rack job and is all set to go. LLP is getting set for 50 Mc. Thanks, gang, for the swell cooperation during the past year and I'm counting on your continued support to keep Michigan at the top. Merry Christmas and Happy New Year to all. Traffic: (Aug.) W8TBP 15, YBR 12, GSJ 9, YDR 6, DED 4, SWG 3, YCT 3, WOV 2, UTC 1. (Sept.) W8SAY 210, NOH 102, UKV 101, SCW 25, WKK 21, IV 12, ZHB 10, VPE 6, MGQ 5, UGR 4, DNM 3, FX 2, URM 2, OCC 1, RYP 1.

**OHIO** — SCM, William D. Montgomery, W8PNQ — This will have to be a short report. I came down to type it up and found a broken mainspring on the old mill so I am pushing it along by hand. This, coupled with a broken finger suffered in the GCARA Hamfest ball game, makes things tough. RN, our RM, announces the appointment of PMJ as Assistant RM. Also, we hear that PMJ now is married to a wife as well as to radio. Springfield ARA new officers are: JRG, pres.; OG, vice-pres.; QWC, secy.; SXQ, treas. The Findlay Radio Club Hamfest and the Greater Cincinnati Amateur Radio Association Hamfest were both big successes, with about 350 hams in attendance at each function. The last QCEN transmitter hunt on 144 Mc. was won by PNQ, with the Luhn boys second, and PPK third. The latter two cars were 100 per cent radar-equipped, with 'scopes and all, which they used with revolving beams for their directions. Traffic: W8RN 74, EQN 30, UPB 29, PUN 20, ROX 15, YPS 14, EBJ 12, PNQ 6, BCJ 3, DAE 1, NDN 1.

#### HUDSON DIVISION

**NEW YORK CITY & LONG ISLAND** — SCM, Charles Ham, jr., W2KDC — A postsummer slump has come over us and only one EC reported to Vince, the SEC. However, the boys may be short on paper work but their other activities compensate. In the October AEC Test emphasis was placed on 2-meter/80-meter liaison. The AEC picnic at Bethpage was enjoyed by all and even a Maine ham and a Chicago ham showed up to share the perfect weather. New 3.5-Mc. AEC members are AA and MJO, the latter a former WERS member. This net guarded its frequency 72 hours straight during the Florida hurricane, but nary a message. This net is now expanding to combine traffic-emergency

duty, and all interested should call in on 3600 kc. at 1930 daily. Brooklyn's sparkplug, OHE (the old coffee-hound), reports fall activity on the uptrend; all messages are now handled in standard ARRL form. Cooperation is being given to the Amateur UHF Institute of New York, which has just been granted a club call, WCR. The Institute sponsored a picnic at Belmont State Park and much rivalry was shown in a balloon-blowing contest between 144- and 3.5-Mc. operators. 9LWE gave a swell talk on v.h.f. activity in the Midwest. AUF, will you please explain HH? KU and JSJ are going to town on 235 Mc.; OHE plans a half-gallon on 144 Mc.; JBQ and his XYL are doing a fine job mobile. The Corona Community Radio Club has been formed and has a very commendable record of past activities and future planning. The club frequency is 29,280 kc. at 2200 daily. A camp-fire outing was held at Holliswood on Sept. 26th with refreshments, songs, and a mobile transmitter. An XYL auxiliary is under way. KCA, Lloyd Rauppis, of 29-10 Gilmore St., Elmhurst, is secretary. The NYC-LI Net is resuming activity, with new members all the time. The frequency still is 3710 kc. but the time has been changed to 1900 Mon.-Fri. OBU is a new RM. The NYC-LI Net held an alleged fishing party out of Northport during the summer. It is rumored that little "fishing" was done. A tank transmitter provided communications under perfect conditions. BNX announces a new baby girl. Bill was QRL for a few days. SJC is slowing up on his 144-Mc. activity, due in part to new rig construction taking all Ed's time. AYJ is QRL but should be on again soon. EC announces that TLAP resumed operations Sept. 20th with twenty regulars coast to coast. RTZ has a problem with the NYC-LI Net at 1900. His family uses the dining room then. KYV still is at Normans, building a new modulator for 28-Mc. 'phone. PWJ handled some K2AL traffic. RQJ finally hit WAS; Joe is looking for 7-Mc. traffic. TUK is QRL at school but takes time out Tuesdays to be NCS on NYC-LI Net. BO acted as monitoring station for 41 hours during the Florida blow. TYU is at new QTH; skipping 144 Mc. per FCC, says "Pop." OG, PKD, KDC, BSL, BSP, MHD, and many, many others enjoyed a perfect week end at the Asbury Park Hudson Division Convention. Traffic: W2TYU 320, BO 218, TUK 134, QYZ 56, OBU 40, RQJ 36, SJC 23, PWJ 14, KYV 4, RTZ 4, EC 3, UGZ 3.

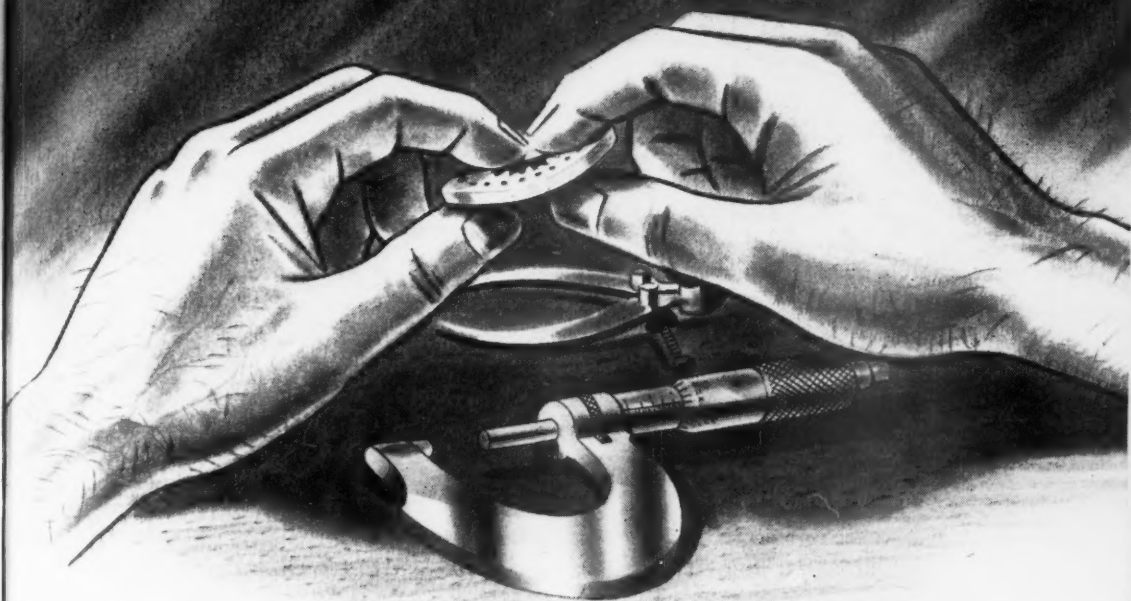
#### MIDWEST DIVISION

**IOWA** — SCM, William G. Davis, W0PP — The Iowa City gang is going great guns with its EC set-up holding surprise drills under the direction of TWX and with the close cooperation of RSI, UTX, and NTL. The Cedar Rapids gang is doing good with its mobile 28-Mc. rigs, and has had several 28-Mc. mobile parties and great success in the various projects. The climax came Oct. 5th at Backbone State Park with a 28-Mc. mobile picnic. New 3.85-Mc. 'phones in Cedar Rapids are: 9RZR, #ICQ, DZV, AUQ, and ADQ, with more coming. BPG worked nine countries on 3.85-'phone. WQQ is on 50 and 3.85 Mc. The Clear Lake picnic was a great success. WML and JUI worked their 3.85-Mc. portables with good results from the picnic site. PP joined the increasing number of hams with BC-654s for emergency rigs. 144-Mc. activity is looking up with UOP, CHI, WGZ, CYL, and TIO. WGZ worked 3GV on 144 Mc., setting up some kind of record. NMA is hard to hold; he reports by letter from Missouri and a few days later from Sioux City through his portable. The Iowa 3.85-Mc. 'phone net is included in the Iowa National Guard's communications plans in case of any emergency where the Guard is called out. The Tall Corn Net was reactivated Oct. 1st and needs more members. If interested, contact either HMM, at Davenport, or AUL, at Des Moines. FP is new SEC for Iowa. Check your various appointments and renew promptly if necessary. Traffic: W0HMM 35, AYC 28, PP 28, AUL 20, FKB 12, AEH 11, GKS 4, SEF 4, TJC 2.

**KANSAS** — SCM, Alvin B. Unruh, W0AWP — The QKS Net resumed operation September 29th with a good turnout. KSY and OZN have been appointed RM to assist NJS. New netters heard include NCV, CXF, and IFR. EC KPJ reports considerable interest in 144 Mc. with several receivers and transmitters completed and others planned. OZN replaced 809 modulators with 811s and upped final input to 400 watts. To the many Kansas friends of Augie McCollum: He now is 9HS in Chicago. AHG has returned to Topeka. CGW is a new KVRG member. ZAT is working lots of DX on 28-Mc. 'phone. BDU will leave for a job in Peru, and hopes to work the Kansas gang with an OA call. IFR has 300-watt 'phone and 15-watt c.w. rig with e.c.o. PZP

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says the sky wire is a problem for cliff dwellers, but he showed up on the QKS Net nevertheless. LQS has mobile rig as well as the big 'phone-c.w. rig for which he is building e.c.o. exciter and phase modulator. BPL (OO) says some 'phones are crowding the edges with sidebands outside. AHM is on 7 Mc. with 40 watts to 807 at Great Bend. KEI fell heir to 40-foot telephone pole. BQJ is chasing DX. Plans are being made for a 75-meter 'phone net. Frequency is to be shared by State 'Phone Net and State Emergency Net. Write! Traffic: W0BPL 6, KPJ 3, OZN 2.

MISSOURI — SCM, Mrs. Letha A. Dangerfield, W0UD — Activity is picking up with more in the traffic list. WXO tops the heap by hopping back and forth from 7 to 3.5 Mc. for traffic schedules. No. 2 is ARH, who varied the routine by altering the grid circuit of his 813 final and building a new 28-Mc. rotary beam. TXP, Willow Springs EC, reports formation of a ham club with one eye on its use for emergency work. VMO is putting the Green County AEC through its paces while up in Tarkio; SKA is beating his brains out trying to lure the gang into the fold. Both VMO and SKA are regular members of MON. GBJ has the gear shifted and back on the air. GCL bought a new surplus bug and is being transferred by CAA to Rolla. CXE reports the organization of a small club in St. Louis with CXE, VAK, RTG, HVJ, KID, BOS, APW, and RAU as members. CRM had a busy month; he reached his 63rd birthday and made his 106,208th QSO since 1922. VEE is running 400 watts to a pair of 8005s on 14-Mc. 'phone and c.w. and 7-Mc. c.w. JWJ sends a bit of YL dope: DBD is on 14-Mc. 'phone evenings. GYZ changed leads on 28-Mc. beam with good results. KIK has a new BC-348 receiver. ECE finally got his crystal for MON and alternates net schedule with the YL. DEA, candidate for Midwest Division Director, never forgets to send in a report even when it has little activity on it. OUD is back on MON but strays down to 7 Mc. for schedule with IGW and a few QSOs. ZVS is doing an FB job as NCS for MON and YSM is the old standby. AGB is a new ham and a new netter. Now about this AEC. You don't wait for a fire before you buy an extinguisher. How about it? Traffic: W0QXO 359, ARH 166, CRM 24, SKA 22, ZVS 21, DEA 12, ECE 7, VMO 7, ZZW 5, KIK 4, OUD 4, KCG 3, TXP 3.

NEBRASKA — SCM, William T. Gemmer, W0RQK — Section Emergency Coordinator MLB needs ECs and AEC members in various parts of the State. Please contact him on 3.85-Mc. 'phone or by mail at 305 W. 24th St., Kearney. How about traffic reports from the traffic-handlers? Let's see if we can get a traffic net started in Nebraska. CMO has RM appointment. DMY renewed his ORS appointment. There are all types of appointments waiting for those interested in the different phases of amateur radio. Let's hear from you. AUS has a new all-band exciter consisting of a 6V6-6SN7-807. BQP transferred to Chicago for A.T.&T. TQD has 8005 push pull final and new pair of 60-foot towers for antenna. IEO is using 810 final on 14 and 7 Mc. DMY is installing 810s in push pull in final. BIW has push pull 100THs in final on 28, 14, and 3.85 Mc. DNW is using LM-10 frequency meter as variable frequency oscillator. WOB has gone East to school. BPY put up four-section 8JK and immediately worked several Europeans. Fellows, I am waiting for more reports and inquiries regarding the various appointments. Let's hear from more of you.

## NEW ENGLAND DIVISION

CONNECTICUT — SCM, Edmund R. Fraser, W1KQY — I wish to express my sincere appreciation for the splendid cooperation given me during the three terms as SCM. Club News: HCARA — LKF, club EC, has conducted several emergency drills on 28 Mc. with hams in the vicinity of Hartford using portable-mobile equipment. NARL — The club call now is QMF. DXT has been attending Nutmeg Net drills regularly. BARA — A 1-kw. generator has been obtained for emergency operation. CQRC — Ed Toloski, secy., writes the club now is affiliated with ARRL. Participation in Red Cross Disaster drill was held under the direction of EC BIH. NHARA — Newly-elected officials are: OKX, pres.; NGQ, vice-pres.; ATH, secy.; JQK, treas.; KQY, LTZ, and OCH, directors. KZ5AH, club member, schedules KQY. TD, MVE, JHN, and NWC are building kw. finals. ECs IGT and TD had New Haven and West Haven nets in operation during Red Cross emergency demonstration. SARC — Deitz reports the club participated with the Red Cross in emergency drill with BRL operating from a plane. The Tri-County Radio Council, including hams from New London, Norwich, and

Westerly, held a Field Day and hamfest. News in general: Asst. SCM VB and RM EFW have New England and Nutmeg Nets functioning smoothly. VB, LKF, and DAV covered the Nutmeg Net during the week end of Red Cross disaster drills. The ORS meeting in New Haven was attended by ADW, BDI, BHM, CTL, DAV, DXT, EFW, FMV, HYF, IC, KYF, KQY, MHT, NJM, ORP, QAK, TD, VB, and 6JQB/1. 2RTZ kept schedule with 2PNB while visiting with BUD. 3LVY/1, 6JQB/1, and VE3BLZ have INF on the air using 6L6-6AG7-809 and BC-348Q. PCZ is operating in Stamford with 6L6, all bands. ZL has 100 countries post-war using antenna 16' high with 200 watts. BIH claims 128 using three-element beam. JJR is on 144 Mc.; APA is on 28 Mc.; and HV is on 14 Mc. BEQ has 102 countries on 28-Mc. 'phone. DEP has new modulator 120 watts to 807s. Traffic: (Aug.) W1AW 138, NJM 123, ORP 42, KQY 28, APA 16, ZL 12, DXT 4, BDI 3, BGJ 2. (Sept.) W1AW 272, NJM 104, EFW 57, DAV 45, ORP 40, JQD 36, KQY 32, INF 22, BUD 4, BGJ 1.

MAINE — SCM, F. Norman Davis, W1GKK — SEC: LNI, PAM: FBJ, RM: NXX. New OPS: AFT, AMR, KOB, and OHY. MGP, now back in the Air Force, visited AMR, FBJ, JJJ, MIR, and OHY. LYW, OCT, and AGI are technicians for the State Police. PXE and KNJ are working 7-Mc. band. CPL, DEO, ECM, IUM, LOA, LZI, LNI, EFR, and OKU all have SCR-522s and keep the 144-Mc. band hot around Portland. OKU has returned to the University of Maine. During the summer he worked New York and all the New England States except Vermont on 144 Mc., and also carried out a fine code practice program on 144 Mc. FV built a VFO and an electronic key, has an HQ-129X and a BC-375E, and is building a p.p. 813 final. He recently received his Old Timers Certificate. DFC has a BC-348P. NKM built an addition to his house for a new shack. Maine was well represented at the Manchester Hamfest and a few of the boys managed to snag prizes. LOA won the QSL Contest. The Seagull Net members have started the Maine Emergency 'Phone Net on the same frequency, 3960 kc., and are doing a fine job. Drills are held every day at 5 p.m. and quite a bit of traffic is being handled. The Pine Tree Net is in action again and anyone interested in c.w. traffic-handling should get in touch with the RM on 3550 kc. any evening, except Sunday, at 7 p.m. Anyone that can possibly work both nets will be welcomed to give better coverage of the State. Traffic: W1FBJ 18, OHY 14, KOB 11, LKP 9, DAS 7, AFT 6, AUC 5, OKU 3, AMR 2, KEZ 2, LOA 2.

EASTERN MASSACHUSETTS — SCM, Frank L. Baker, jr., W1ALP — Our new RM for the 3.5-Mc. c.w. band is CCF, of Haverhill. The Eastern Mass. Net, on 3745 kc., is on at 7 p.m. The SCM for Western Massachusetts tells me that their Emergency Net frequency is 3760 kc., which is very close to ours on 3745 kc. It is hoped that we can work together in this State in this emergency work. GW is getting the c.w. bug again. The following have renewed appointments: MALL, AHP, FIK, and MD as ECs; AQE as RM for 7 Mc. and ORS; RP as OBS and OPS; PFL as OES. MON has moved to Stoughton and is EC. MRQ is EC for Groveland. PCJ is on 3.85-Mc. 'phone. LAO is OBS. The Framingham Radio Club elected the following: MOJ, pres.; PAD, vice-pres.; MSZ, treas.; James Ragena, secy.; CTR, act. mgr. The club meets the 2nd and 4th Wed. nights. MD has a 42-ft. telephone pole all his own. Officers of the N.U. Radio Club, KBN, are: MTQ, pres.; NYA, secy.; ODO, treas. Members are: QFT, QCR, PPR, PCE, NAK, OIB, OUZ, NCV, and NSW. The 56 Mc. Minute Men have started their meetings. MGP, stationed at Grenier Field, N. H., comes home week ends and has schedule with MIR. PXH has a 522 on 144 Mc. ZN will be on 3.5- and 7-Mc. c.w. MQH has a BC-348. WI gets on 7 Mc. and has some VFO surplus equipment. LXQ will be on 28 Mc. BAQ has a new four-element beam and has worked Connecticut and Maine. NK and HMH gave talks at the Eastern Mass. Club. MEG is on 144 Mc. with a BC-625A. VHF-125A six-element beam. The T-9 Radio Club had supper at Mrs. Pike's and then met at HBG's. New officers of the Eastern Mass. Amateur Radio Assn. are: MPP, pres.; ALY, secy.; JNX, treas.; AF, RQ, and HNN, directors. The Waltham Amateur Radio Assn. elected the following: IHL, pres.; JCI, vice-pres.; D. B. Berry, secy.-treas. The club station, MHL, is on 28-Mc. 'phone and the club meets Tuesdays, 8 p.m., at Waltham Watch Co. The South Shore Amateur Radio Club held a meeting at the Hingham Naval Reserve Armory. OEG is on 3.85-Mc. 'phone. The Brockton Amateur Radio Club holds meetings the 1st and



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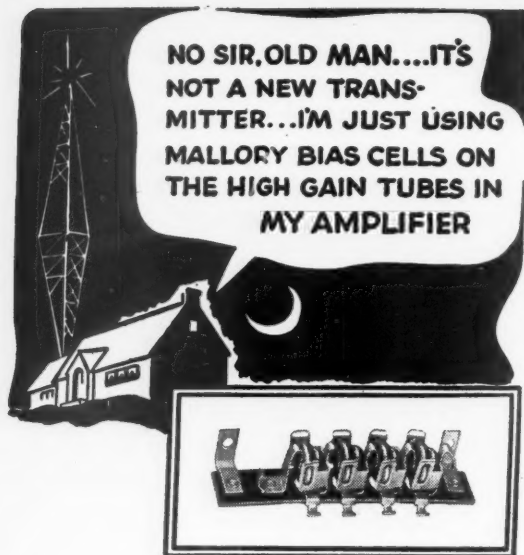


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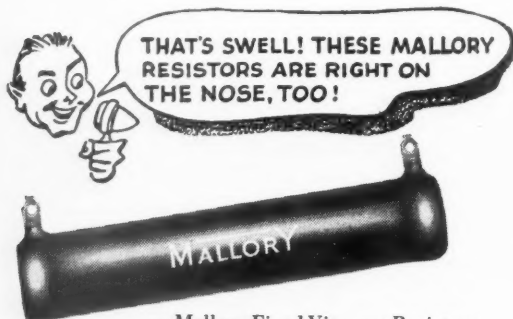
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(Continued from page 78)

3rd Mondays of each month at 8 p.m. at the YMCA. AYG worked CSENG, a life-long friend in Port Laurenty. HWE is in the Essex Sanatorium, Middleton, Mass. PIW worked a G and 7 Mc. AAL has n.f.m. on 28 Mc. BB has four beams on one rotator working FB. OJT has three-element beam for 28 Mc. and has 43 states. LAO has a modulation meter working FB. ASN has 28-Mc. beam 40 ft. up. New Lynn hams on 28 Mc. are: QHI, PDH, NKW, and GAD. OSB has an HT-9 on 28 Mc. TY has an HQ-129. HJ is building VFO and beam for 28 Mc. PZG has been working nice DX on 28 Mc. QHC has scheduled with 50L in Dallas. PTJ is building rig for 28 Mc. We are sorry to have to announce the death of AJW. NF is vice-chairman of VWOA and worked 01FB and 8CYE on 50 Mc. Traffic: (Aug.) W1KTU 6, OEG 6. (Sept.) W1BDU 212, OJM 77, EMG 58, AAL 40, MTQ 34, JCK 19, KTU 17, BB 16, QHC 6, MDU 4, PZG 4, LAO 3, OJT 2, HJ 1.

**WESTERN MASSACHUSETTS** — SCM, Prentiss M. Bailey, W1AZW — RM: BVR. SEC: UD. The Western Massachusetts Net is off to a swell start with many new traffic-handlers reporting in. BVR is sure pleased and rightly so. BVR leads the traffic total again this month. How about a little competition? JE has been playing around with a 522. JAH rebuilt his receiver's r.f. stage, incorporating a 6AK5. He says it's real hot now. MIV is new AEC member and is completely emergency supplied. Can't tell the difference when he changes over. IBZ is new OPS and OBS. He transmits official bulletins on Mon., Wed., and Fri. at 10 p.m. on 28,576 kc. He has a new three-element beam and is building an R-9er. QKX is new ham in Whalom and a member of Fitchburg Radio Club. The club station, LXT, is now on with 250 watts and reports into WMN. MBL took a gander out to the Windy City for a couple of weeks. The Fitchburg Club extends an invitation to any other radio clubs to visit them. Just write to MIM and make the arrangements. QKX soon will be ORS. During the Florida hurricane the Hampden County Emergency Corps was alerted and contact was established with Red Cross Chapter in Springfield just in case. LDE, NY, BVR, and UD, as well as others, handled Florida traffic. A new call in Pittsfield is QJZ. Walt has a Bendix transmitter and BC-348. Believe it or not, JLT has a vertical three-element beam for 14 Mc. It's quite a structure. He has finally received his DXCC Certificate. LKO has a full kw. on 14 Mc. HNE acquired a Meissner Signal Shifter. AZW visited the Fitchburg Radio Club and was treated to a very swell evening. The AEC net frequency for 3.5-Mc. c.w. is 3760 kc. and plans are being laid to have monthly sessions. Traffic: W1BVR 64, AZW 33, MIM 8, MIV 8, BIV 5, JAH 1.

**NEW HAMPSHIRE** — SCM, John H. Stoughton, W1AXL — Well, gang, this is the last report from yours truly. Your Acting SCM will be AUY. He is more centrally located and will make a good man. Let's all get back of Henry and give him our full support. A 144- and 28-Mc. roundup was enjoyed at the summer QTH of MCS, Partridge Lake, Littleton. Those present were: AP, JNC, KPD, LTW, MCS, MMC, and 2NSD. Two SWLs, Paul LaMere and Oscar Malenfant, also were present. We are not receiving any reports from the gang in the northern part of the State. How about someone up there sending in a little news so we will know what is going on? That's all from Old No. 4. Send your reports to Henry Izart, W1AUU, Mast Road, Manchester.

**RHODE ISLAND** — SCM, Clayton C. Gordon, W1HRC — The R. I. Traffic Net on 3540 kc. is in full operation Mon. through Fri. with Net Control Stations BTV, QR, HLY, ODJ, and INU, Mon. to Fri. respectively. The R. I. Net will supply a control station for the New England Net on each Wed. night. BTV has Meissner Signal Shifter driving 809 working. DWO took 5 watts to Maine and did better than at home with the regular rig. INU has new transmitter with glass front doors, ventilated sides, and safety door switches. The NAARO has 25 members and on Sept. 26th MIJ, Acting SEC, led them in planning their emergency work. After that PLY, who is EC for the NAARO, showed movies on radar and oscilloscopes. BFB and NCX are working DX on 14 and 28 Mc. respectively. AJQ is active on 28- and 14-Mc. 'phone. PLV is on 28 Mc. with 35-watt portable. LFE has South Africa, Italy, and 32 states on 28 Mc. LWA is on 7 Mc. CJH is running a new pair of Eimac 327As on 28- and 14-Mc. 'phone. QBZ has the 522 receiver converted and working. DAH is making things hum on 14 meters. HRC put the finishing touches on a couple of 274N

(Continued on page 82)

# SPRAGUE TRADING POST

**SWAP** — Will trade magic equipment, lessons, books, magazines; new books of popular piano music, or large rubber stamp outfit with 10 holders for anything pertaining to radio. Especially interested in radio courses, surplus equipment and two radio-telephones. State what you have and what you want. J. M. Segel, 5214 Spruce St., Philadelphia 39, Pa.

**FOR SALE** — New Bud WM-78 wave-meter \$5.00; RCP 446 multi-tester \$9.50; Candler Systems Junior Code Course like new \$20. Eugene Cheney WØRJD, Box 108, Nora Springs, Iowa.

**FOR SALE** — 12" RCA television tube 12 AP4 slightly used. Big bargain \$20, will demonstrate tube to prospective buyer. H. Bergh, 1583 E. 96th St., Brooklyn 12, N. Y.

**WANTED** — Used and in good condition preselector. Will trade new U. S. Army Airplane compass type B-16 as part payment. Murland D. Francisco, 934 E. Orange St., Lakeland, Fla.

**FOR SALE** — FB7XA preselector power pack all National with band spread coils for 80-40-20-10. All new bypass and filter condensers. A-1 shape with good tubes. Best offer over \$45. Wilbert Schwark, 193 W. 12th St., Fond du Lac, Wis.

**FOR SALE** — S20R new condition, \$55; S-29 Sky Traveler in very good condition, \$45, (less batteries); both newly realigned; brand new National 686 vibrator pack \$14. F.O.B., R. Turner WØEZZ, 255 Clayton St., Denver 6, Colo.

**SELL OR TRADE** — Rider manual 1, \$5; Simpson Hammett No. 240, \$13; Robeson-Burgess multimeter, \$14; Remington S.S. bolt action 22 Rifle, \$7.50. Need Jackson cond. tester; Silver Vomax or similar instrument; 1/4, 3/8 or 1/2 h.p. motors (a.c.); 8" bench saw. R. E. Schmidt, 1029 N. Notre Dame Ave., S. Bend 17, Ind.

**FOR SALE** — Super meter 670 very little used, \$20; Superior 450 tube tester used 2 weeks, \$30; also new tubes and condensers at big discount. Norman Blankenship, Granby, Mo.

**FOR SALE** — Bendix signal generator, \$25; Dayco tube tester \$25 both in excellent condition. Eagle Glen Radio & Bike Shop, 2935 West Broadway, Eagle Rock, L. A., Calif.

**FOR SALE** — S-20-R Communications receiver, perfect condition, \$50. S. Schneider, 1051 Ward Ave., Bronx 59, N. Y.



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**WANTED** — For BC-223-AX army transmitter a model PE-55 dynamotor unit, plugs PL-149 and PL-150 and control box BC-321. Also instruction book and 110 A.C. power pack for BC-348-Q receiver. Wm. Hansen, 165 Silverbrook, Niles, Mich.

**FOR SALE** — Hallicrafters S-41-W receiver modified to take phone pickup, good condition \$25. Also precision E-200 signal generator good condition \$40. K. R. Sheetz, 1804 So. 7th St., Terre Haute, Indiana.

**FOR SALE** — BC348 receiver in excellent condition, not converted to A.C. \$35. W4JTZ, 511-17th St., Bowling Green, Kentucky.

**FOR SALE** — Used 4 weeks, National model NC-100 ASD receiver, covers from 200 to 400 KC and from 1,300 to 30,000 KC in four bands. Operates on 110 to 125 volts either 25, 50 or 60 cycles, \$190. John F. Lavigne, 444 5th Avenue, Troy, N. Y.

**FOR SALE** — Double push-pull power amp., all transformer coup plus power supply 1200 volt — 250 ma. all heavy duty Amertran parts also includes Jensen concert hall dynamic speaker with own field coil voltage supply \$35 postpaid. Robert E. Lee, 217 Johnston Avenue, Trenton 9, New Jersey.

**WANTED** — Gift or loan of schematics or other information re BC433G, SCR522, BC457A, BC458A, Birch. BRS8997. 47 Halsall Road, Southport Lancaster, England.

**FOR SALE** — Hallicrafter sky challenger receives 540 KC to 38 MC. John F. Hynes, R. D. No. 3, Norristown, Pa.

**FOR SALE** — RME-DB-20 preselector, all new tubes \$35; G. E. transformer, 110 v. 60 cycle, 15,000 volt, 30 mils, very husky \$10. Joe Tucker, 866 East 48th St., Brooklyn 3, New York.

**SELL OR TRADE** — Completed 1946 N.R.I. radio course like new; will sell \$35 or trade for communication receiver or what you have, f.o.b. Travis Heard, 893 Woddell St., Athens, Georgia.

**FOR SALE** — Hallicrafter SX18 sky challenger in good condition with matching speaker \$35. Andrew J. Pavlowski, 346 Bennett St., Luzerne, Pa.

**FOR SALE** — Hallicrafter SX28A used 10 months with speaker in good condition; selling on account of sickness \$140. H. C. Wehrenberg, 767 Washington Blvd., Baltimore 30, Md.

**WANTED** — Instruction manual or schematic for BC-348-Q. George L. Fuller, W2BSH, 2094 Oaklawn Avenue, Schenectady 6, New York.

**FOR SALE** — S-40A communications receiver in excellent condition used about 3 months \$75. Halverson Radio Service, Bagley, Minnesota.

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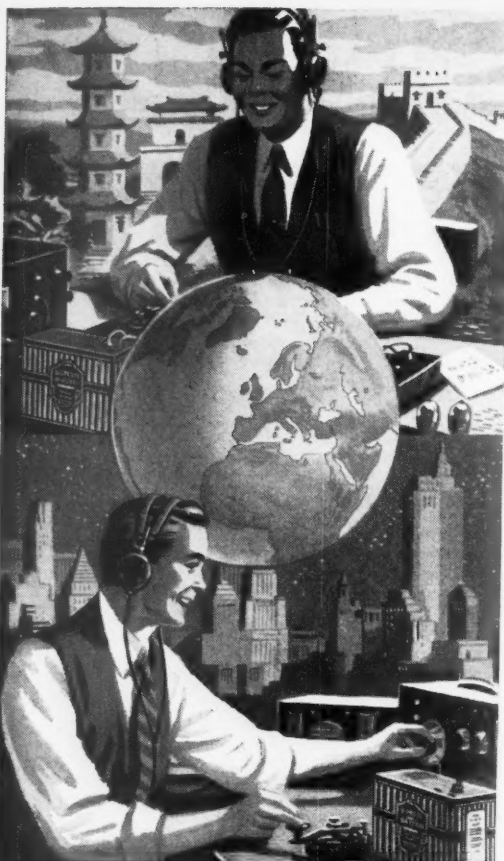
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(Continued from page 80)

units for 3.5 and 7 Mc. Traffic: WIDWO 53, BTV 38, QR 34, INU 28, AJQ 1.

**VERMONT** — SCM, Gerald Benedict, W1NDL — New officers of the Burlington Amateur Radio Club are OHD, pres.; GKA, vice-pres.; and NLO, secy.-treas. Vermont was represented at the N. H. Convention by AHN, LIE, BJP, GNF, KEP, IQG, and NLO. A new ham in the Burlington area is Donald Shorey, IQH, who has 50 watts on 3.5 Mc. GQJ and CBW have BC-645 to put on the 400-Mc. band. NLO has a new jr. operator, an 11-lb. boy. Traffic: W1AVP 8, MCQ 2.

## NORTHWESTERN DIVISION

**ALASKA** — SCM, August G. Hiebert, K7CBF — The Adak Amateur Club voted W7ELJ/KL7 president and GR secretary. GR reports an Adak C.W. DX Contest for Stateside contacts. Maximum power permitted is 10 watts, with any kind of skyhook. The winner will receive a special club award of merit. After a long and intensive effort to contact Pacific Northwest stations on 144 Mc. from Adak, W2SLW/KL7 has been transferred to the States. LO is new at Adak and operates 28-Mc. phone. BD reports trouble with his daily VK2VC schedule because of disturbed Polar magnetic conditions. Results in beautiful Northern Lights but no signals. Anchorage lost one of its topflight amateurs when CA was transferred to Washington, D. C. AD is operating BE's radio store while the latter is in the States on business. In between customers he works DX with 600 watts on 28 Mc. Traffic: KL7BD 6, GR 5, DM 1.

**IDAHO** — SCM, Alan K. Ross, W7IWU — Pocatello: KEA is temporarily located with BDL and they have pooled equipment to end up with pair of HK54s and Super-Pro receiver. Twin Falls: JMX, recently moved here from Miles City, Mont., is president of newly-organized Snake River Valley Keys and Mikes Club. IOA is vice-pres.; LNC, secy.-treas.; ex-11RA, publicity officer; and KEK, activities mgr. Mountain Home: IY has new Meissner Signal Shifter on 7 Mc. with p.p. 807s final. Boise: HPH, KJO, and IWU have SCR-522s on 144 Mc. now in local net. IWU has Mark II rig fixed to operate in the car and the 144-Mc. section works FB mobile. The antenna tuner clamped to the side window draws plenty of "what is it" as I drive through town. Let's have some reports from Moscow and points north. Our Gem Net on 3745 kc. needs a station from up that way. Traffic: W7EMT 13, IWU 10, KEA 2.

**MONTANA** — SCM, Albert Beck, W7EQM — SEC: BWH, IWW, who has a kw. on 28, 14, and 4 Mc. with indicating rotary beams, etc., reports a good beam-growing season in Billings. KJS and FTV have three-element beams on 28 Mc. JBC is on 28 and 14 Mc. with a converted Meissner 150-B and is soon to put up a five-element wide-spaced 28-Mc. array. JFA has 600 watts on 28 and 14 Mc. and is erecting a four-element wide-spaced array on 28 Mc. LIT is the newest licensee and member of the SMARC. EJJ moved to Oregon. LCM is on 3.5 Mc. FHC is the only active ham in Carbon County. DSS is very busy proposing constitution and by-laws for Glacier-Waterton International Hamfest Association. JKR is going in for more power. AFR 7 now is in Anaconda on 28 Mc. LNU and LNS are new calls in Butte. BIS is constructing 28-Mc. rig. INC has antenna trouble. IVY is working DX on 28 Mc. While LBK was directing scout activities in the mountains during the month of July, the arrival of his new jr. operator was announced via radio schedules kept with DXQ, BCE, and LCM. LBK's XYL is a VK. JMX moved to Twin Falls, Idaho. EQM is working portable at Silver Gate and keeps regular schedules with the gang at Butte. JKR was appointed EC for Helena Club.

**OREGON** — SCM, Raleigh A. Munkres, W7HAZ — Grants Pass: 9JY, formerly 7CZJ, is in Chicago but longs for the Oregon country. FTA is running one to three watts on Onion Mountain and has worked as far as Adak in the Aleutians! Medford: RE has Class A and is on 3.85-Mc. phone. JSA moved to Boise, Idaho, and is heard from that location. HLF is holding down the 144-Mc. band as far as Medford is concerned. Salem: Elmo Decker received the call IMO! JTH, AWE, and FRT now are Class A. ASG has received his plumber's license and it is said he is specializing in "plumber's delights." Klamath Falls: New calls are LHG, IGT, and LKG. IPI has moved to Klamath Falls. JBF is now VK and Class A. HVD had the misfortune to lose most of his shack and gear because of fire. Ashland: GK vacationed in British Columbia. BQK has very elaborate

(Continued on page 84)

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# A Whole New Line of... DIRECT CALIBRATION DIALS

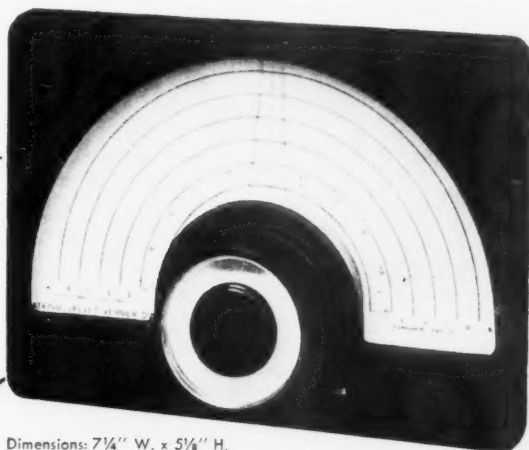


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The SCN dial provides the same dial scales as the ACN dial but in a reduced size. It is used where economy of panel-mounting space is desirable and where a smaller dial would be out of proportion with the size of the panel. Amateur Net.....\$3.00



3 1/4" W.  
2 1/4" H.

The MCN dial has been scaled down to lend itself ideally to mobile installations and small converters and tuners. It may also be mounted on the standard 3 1/2" rack panel where such mounting may be desirable. The dial provides three calibrating scales and a 0-100 logging scale. On the rear side of the dial, the mechanism extends 1/4" below the dial frame. Amateur Net...\$2.70

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(Continued from page 82)

rate 28-Mc. rig built in a desk with automatic relay control throughout. GLK works the YLRL round table on 14-Mc. c.w. FRO made a 500-mile trip on a motor scooter. Nothing said about any mobile operation! Tillamook: What with three Pauls in town they had to be issued numbers — BUH No. 1, HCN No. 2, GKC No. 3. Eugene: EXB is working overtime to get KASH on the air. KL has new country home with 120-foot trees for masts. FPY had the same misfortune as HVD. Fire destroyed his garage which housed his kw. rig. He has since acquired about enough equipment to get back on the air. Traffic: W7HBO 4.

WASHINGTON — Acting SCM, Clifford Cavanaugh, W7ACF — CZY resigned his appointment as SCM because of hospitalization. We're sorry, Larry. Good luck. The following are new ECs: KWC, Bellingham; KKI, Bremerton; JDC, Auburn. The Valley Radio Club, Payallup, has local rag-chewing net. LEC is NCS, with KHL, JJK, IVJ, EHJ, and JKO as regular members. LIL is interested in AEC beside being Tacoma outlet for Washington Section Net. BTY installed a pair of 100THs in final. EYS worked seven new countries on c.w. APS misses his schedule with CZY. JYQ, alternate NCS for WSNet, wants more traffic schedules. FRU, our RM, is hard at work getting new outlets for WSNet. EKT schedules KL7LL every day. JC has moved to South Bend and wants to get into the WSNet. The Amateur Radio Assn. of Bremerton reports two guests from Seattle: DXF, the Northwestern Division Director, and FVC. The club is making preparations for its annual ham-fest and banquet to be held on the second Saturday in February of 1948. JYQ is supplying the Pioneer Net and WSNet with QN signal cards. CMX has resigned as SEC. Who wants the job? DXZ says he is swamped with QSL cards that no one seems to want. He states that there are some dandies, too. The Washington Section Net, which meets every evening except Saturday and Sunday at 7:15 P.M. on 3695 kc., needs traffic outlets in Eastern and Southwestern Washington. There is plenty of traffic and rag chewing. LJM is a new ham in Auburn. JWD is mixing Morse with Continental, and is moving to Tacoma. ILR is moving traffic on 3.85-Mc. 'phone. GNR and IIT are interested in WSNet. JKO is building a high power rig. We have had several requests for dope on how to get into the Pioneer Net. Our RM, FRU, says there is only one station to a state, so tough luck, fellows. Only nine stations in Washington reported for the month of September. How can your SCM make a decent report to Headquarters with no news? Come on, gang, let's get those cards in. JPX, Washington PAM, would like all OBS schedules and frequencies. Traffic: W7FRU 211, CZY 97, APS 87, ACF 37, JYQ 31, LIL 27, LEC 22, EYS 6

### PACIFIC DIVISION

HAWAII — SCM, John Souza, KH6EL — BW is assembling material for an emergency rig. HF uses "home brewed" VFO into single 813 on 14-Mc. c.w. using end-fed 2 waves. W6ODE/KH6 is modulating an 813 with a pair of 811s from John Rodgers Airport and wants it to be known that it is NOT a remodeled ART-13. Two half-waves in phase look towards Alameda in hopes of keeping schedules with the Bay Area boys. EY is finally on the air giving 3.5 Mc. a whirl. FF and ET had rig operating from Maui County Fair using a pair of HK-254s on 3.5- and 14-Mc. 'phone and a pair of 100THs remotely controlled on 28 Mc. DK and EL are having a swell time on 28-Mc. mobile. EM is looking over the junk box for parts to assemble 28-Mc. mobile. FF is proud possessor of a QSL from AC4YN. LF is constructing 500 watts to a pair of 100THs and expects to join the fun from Hidam Field. Traffic: KH6LF 16, BW 15, W6ODE/KH6 3.

NEVADA — SCM, N. Arthur Sowle, W7CX — Asst. SCM, Carroll Short, Jr., 7BVZ. SEC: JU. ECs: OPP, TJY, KEV, QYK, JLV. RM: PST. PAM: KHU. LCK is active on 7 Mc. and is building a 28-, 50-, and 144-Mc. converter. KHU reports activity on Mission Trail and Farm Nets. The Southern Nevada Amateur Radio Club officers are: BVZ, pres.; KEV, vice-pres.; KVF, secy.; JLN, treas.; JU and RES, act. managers. JU has his kw. on 'phone now. KOH has a four over four-element beam on 28 Mc. NCR has 14 states on 50 Mc. and WAS on 28 Mc. JLN operates 28-Mc. mobile from home to work each day — 60 miles. Southern Nevada AEC served the speed boat races on Lake Mead Sept. 27th and 28th as a test. 235 Mc. was used with a central station on 3898 kc. BVZ, OPP, JU, TKV, KJQ.

(Continued on page 86)

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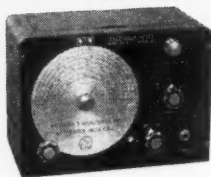
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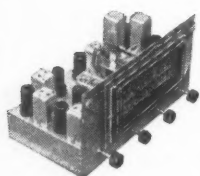
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(Continued from page 84)

JLN, KRI, OOR, LGS, KSR, SXD, Albert Aden, and Curt Moler participated in the activity. Traffic: W7TJY 96, JU 90, KHU 74, BTJ 9, LCK 8, QYK 8.

**SANTA CLARA VALLEY** — SCM, Roy E. Pinkham, W6BPT — Asst. SCM, Geoffrey Almy, TBK. RM: CIS. PAM: QLP. ZZ, KG, HC, MUR, and BPT attended the meeting in San Francisco at which President Bailey gave interesting highlights on the Atlantic City Conference. ZZ has applied for an appointment as UN Amateur Radio Aide. 2KH was a visitor at ZZ's shack. HJP is working a kw. at the University of Minnesota. You can find Art on 14-Mc. c.w. HC held a schedule with MUR, who was working portable at the Mt. Shasta Hamfest. Harry has his power pole up and is ready for FB antenna. 6JVJ is a newcomer to the section. He was formerly located at Pueblo, Colo. His XYL is holder of 0AAD. WNI now holds regular schedules with WIAW. Anyone having traffic for the East can contact him on 3750 kc. any night after 8 p.m. He now uses an electronic bug patterned after the article in August '45 QST. CIS has worked two new countries, giving him a post-war total of 115. KG now is in the electrical contracting business. CFK has been appointed EC for San Jose. Those interested in emergency communications work should contact him for details. The members of the San Mateo Radio Club are building several 144- and 50-Mc. portable-mobile rigs for their planned emergency network. Amateurs around San Mateo should contact the club there and get in on this excellent project. Season's Greetings to you all. Traffic: W6WNI 30, HC 15, TBK 13.

**EAST BAY** — SCM, Horace R. Greer, W6TI — Asst. SCM, C. P. Henry, 6EJA. SEC: OBJ. RM: ZN. EC: QDE. Asst. EC u.h.f.: OJU. TT was the first East Bay man and fifth W6 station to receive his postwar DXCC Certificate. Elvin now has 144 postwar countries. EE has new Collins 75-A receiver and a 1-kw. Winsby-Flemming transmitter. IDY is rebuilding transmitter for rack mounting. SQ/1 is a W6 again and will operate 28-Mc. mobile most of the time. WP can be found hunting DX. QLH is back on the air at last with his new beam up again for the third time. BUY is moving to Walnut Creek about the first of the year; he is building a new home on million "air" row. AED plans to have his ART-13 drive his final. UPV replaced his elements on his beam and enlarged his shack. IKQ is all ready for 28-Mc. DX. PB is rebuilding two new finals with a pair of 250THs for 28 and 14 Mc. MEK has added another 250TH to his final. The East Bay section regrets the passing of RM's XYL. On Sept. 24th the Oakland Radio Club, in conjunction with the East Bay section of the ARRL and other East Bay amateur organizations, was host to 2KH, ARRL president, who gave a most interesting talk. 1DX was a guest speaker at the Northern California DX Club meeting on Sept. 11th. "By" was out from ARRL visiting his family but could not forget radio while off the job. ZIG has a code class every Wednesday at 6:30 p.m. on 29,016 kc. CRF has been QRL. Ye Old SCM, TI, would like to take this time to wish everyone everywhere a Merry Christmas and a Bright and Happy New Year. RMM has new three-element beam for 14 Mc. EJA worked five new countries during September on 14-Mc. c.w. YDI is on 28-Mc. 'phone. KEK is going to rebuild to a full kw. FDR is rebuilding with p.p. HK-354C final. I would like to have a complete list of club officers and meeting nights and places for all clubs in the East Bay section. OBJ, our SEC, has been doing a bang-up job but needs more help. Those interested in emergency work should get in touch with Omar. We are still looking for another RM; also we need a good PAM. We would like all of you to report your traffic each month. The Mission Trail Net was pressed into service on Oct. 7th by the Coast Guard, when they were requested to establish contact with the Yacht *Shara Lee*, which was reported at first by amateur radio to be in distress. MWK was operator on the boat. Traffic: W6YDI 16, EJA 11, KEK 11, TI 10, RMM 2, CRF 1.

**SACRAMENTO VALLEY** — SCM, John R. Kinney, W6MGC — Asst. SCM, R. G. Martin, 6ZF. SEC: KME. At the SARC booth at the California State Fair 140 out-of-town hams registered, including one each from China and Hawaii. PIV handled most of the traffic from JN/6 via 144 Mc. and then through the Pioneer, So. California, Mission Trail, and Hit & Bounce Nets. Hams that volunteered their time included: GZY, ZF, MIW, WRD, AP, QYQ, BVK, WSL, QKJ, MGC, MBY, UYO, GHN, DLB, VLR, YKZ, WTL, OJW, and 1HK/6. ZF is going to the East Coast on

(Continued on page 88)



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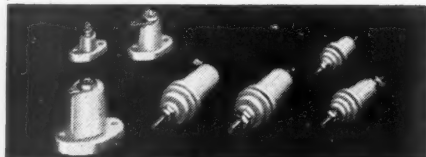
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(Continued from page 86)

business and will have the following transmitting gear in his car: a BC-1335 on 29.4 and 29.6 Mc. and an ARC-5 with a GF-11, 30-watt rig, all mobile. OJW plans high power with 3-75Ts, 2-24Gs and 3-810s. WYX is on the Mission Trail Net daily. REB tells us that the Siskiyou County Fair station, SXF/6, was a great success. RHC reports that QEE and SRW installed rigs on 3.5-Mc. c.w., 3.85- and 28-Mc. 'phone at the Glenn County Fair with about 400 watts and that the GERC now has 46 members. SEC KME reports that BVK has accepted an appointment as EC for Sacramento County and that BLP and AUO, operating at Pyramid Peak at the 9000-foot level with ¼-watt walkie-talkie rigs on 144 Mc., worked stations in San Francisco, Oakland, Willows, and Sacramento. VDR reports amazing DX for 3.5 Mc., ZK1AM at 3550 kc. OJW reports good Official Observing results. Traffic: (Aug.) W6PIV 96, ZF 68, (Sept.) W6PIV 755, JN/6 707, REB 556, ZF 89, ZQD 11, VDR 9, OJW 8.

SAN JOAQUIN VALLEY — SCM, James F. Wakefield, W6PSQ — Asst. SCM, Wilbur R. Osler, VPV. WHB now is in Lodi. EXH, Ripon, and FYM, Turlock, were heard in Fresno by JPU on 144 Mc. SYR is on 28 Mc. with 20 watts. YEX has new KP-81. K6NRO is the Naval Reserve station in Stockton. SARC had station on at San Joaquin County Fair in Stockton and more than 500 messages were handled. GJO has new kw. on 3.85-Mc. 'phone. OYF has new 8005 final. SAH, WQR, and MDQ are portable mobile on 28 Mc. The SARC meets on the air every Wednesday at 1900 on 29,400 kc. ILH has new HT-9. WBZ and LGF are on 3.85 Mc. n.f.m. PRD is on 7 Mc. and holds radio classes at College of the Pacific. The 144-Mc. gang with 522s includes VPV, UWY, INP, PJF, and GQZ in Stockton, EXH in Ripon. ZJQ has 700 watts on 28-Mc. n.f.m. WKT has a full gallon on 14-Mc. 'phone. The Fresno 144-Mc. gang now includes JPU, JCB, BWK, WYT, SGH, and PSQ. IFE, in Reedley, is active on the microwaves and holds 2300-, 3000-, and 10,000-Mc. records. KUT, PCS, and SCU are running neck and neck for the DX Century mark in Fresno. SUV has a new house after a fire wiped out all but the shack last July. He was on the air again two nights after it happened. QOS is on 3.85 Mc. with a 474. LOS has 274 e.c.o.s on 3.5 and 7 Mc.

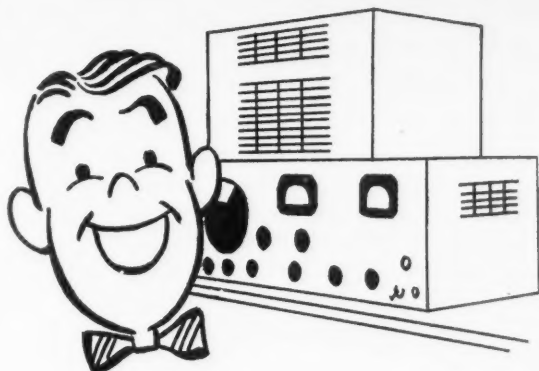
### ROANOKE DIVISION

NORTH CAROLINA — SCM, W. J. Wortman, W4CYB — 0AXH is operating portable in Whiteville and waiting for a new W4 call. He is working on 7 and 14 Mc. Welcome to this area, OM. The Key and Mike Club over Winston way is now one year old. NI is pres.; BCS, secy.; and HUL, vice-pres. BYA has IDO and IFS on 28-Mc. 'phone, and is busy with a new rig for IY. BCS is doing FB with his beam from ZL and ZS Land. HUL is rebuilding. LAH has a neat bandswitching rig in the process of construction. KJS has returned from a vacation and is back on the air. DCW has 375 watts on all bands, but has trouble with antenna. The Charlotte gang had an emergency drill which worked out FB with CFL, CYB, HGC, HEI, EYF, FO, FCB, HJY, HUI, JVL, FKT, and LSU in attendance. All bands from 3.5 through 28 Mc. were used. We hope that the gang enjoyed our hamfest on October 5th. Sorry more of the gang didn't get down. The next one will be held in Winston; the time and date will be announced later. A new club has been organized in Cleveland County. The boys are teaching code and going great guns. Mail should go to Athos Rostan, Box 392, Shelby. Welcome to the ranks, gang. DLX and IMH are interested in traffic net. Contact these fellows if interested. Clubs, please forward recommendation for EC for your area.

SOUTH CAROLINA — SCM, Ted Ferguson, W4BQE/ANG — BSS reports that illness and work have reduced his radio time. MAF has an 812 in final with 115 watts. He will attend the University of S. C. this year. CXE and KDO are to be heard on 7-Mc. c.w. We welcome FM back to our midst. My thanks to MAR for his FB letter and report from Florence. He reports the following new hams in Florence: MCM, MCY, and MCS. FNS reports that KTS will change his QTH to Japan. Lots of luck, OB, and we hope you like it. LJJ is to be heard on 7-Mc. c.w. The 144-Mc. bug has bitten GKD. FMZ reports that all he likes about being on the air at his new location is a sky wire. I hear that KIM is on 28-Mc. f.m.; also that IW is expected to do the same. HMG sticks to his c.w. It's back to school for MAO, MAP, and MAS. However, I believe you will hear them on 7-Mc. c.w.

(Continued on page 92)

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HT-9	5	350.00	35.00	27.83
Coils: 10M—\$10.50; 20M—\$15.50; 40M—\$11.75; 80M—\$10.85				
HT-17	5	69.50	6.95	5.53
Coils: 80M or 40M—\$3.50 per set; 20M or 10M—\$7.00 per set				
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HQ-129X	1	189.15	18.92	15.04
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RME-84	1	98.70	9.87	7.85
RME-43	1	198.70	19.87	15.80
RME-152A	7	86.60	8.66	6.89 or 13.77*
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Signal Shifter	8	66.00	6.60	5.25
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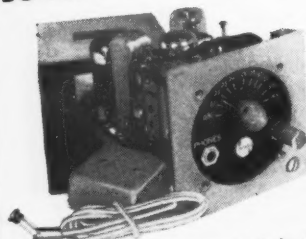
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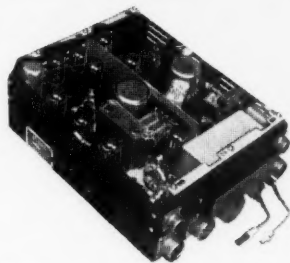
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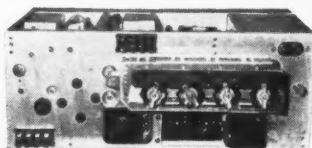
**only  
\$4.95**

## BRAND NEW! BC-645A's for 420 MC only \$9.95 with tubes

Easily converted to make a "hot" xmtr-rcvr for phone or ICW (see QST Feb. 1947), these brand new, G.E.-built outbits make it a cinch to get in on the fun to be found on 420. Originally priced in four figures, we offer them at less than the price of the tubes alone. At this low price, be sure to send full amount with your order.



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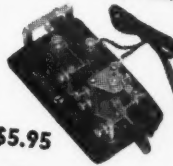


## 100-156 MC Crystal- Controlled XMTR Complete with Tubes

**\$11.95**

Temperature-stabilized 15 watt XMTR delivers 15 watts. Uses two 832s, three 12A6s, one 6G6G, one 6SG7. 28 volt d-c dynamotor powers entire rig. Complete with tubes, plugs, instructions for conversion to 110 volt a-c operation.

## "BUG" KEY Brand New J-36 Limited Quantity



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You'll be pleasantly surprised at this value . . . its counterpart has been sold by a well-known speed key manufacturer at more than double our bargain price. Made for the Signal Corps by Linsell Corp.; supplied complete with cord, wedge plug, and switch.

## BRAND NEW! NAVY AIR-BORNE RCVR MODEL ARB 6-Tube 4-Band Superhet **\$49.50**



Four bands . . . 195-500kc — 1.6 — 4.5 — 9.05 mc. Handles MCW and CW, with MVC and AVC and sharp or broad selectivity. Pilot control box and calibrated tuning head (requires flexible shaft for connection). Designed for 28-volt d-c use, with manual or electric band switching; readily converted to 110-volt operation with manual switching. Complete with tubes and necessary plugs.

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One hundred-foot RG-8/U cable comprising two 50-foot cables **\$3.90**

RG-11/U in stock 5c per ft.

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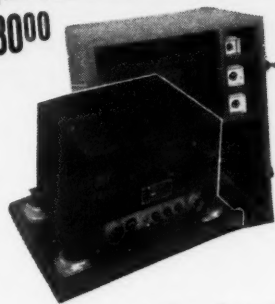
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(35 amp . 5 min.) **\$3.95**



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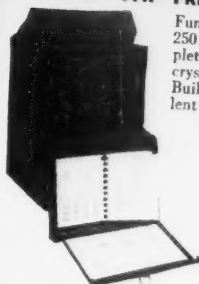
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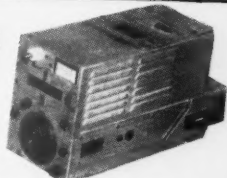
Mfd.	Volts d-c	Net Ea.	Mfd.	Volts d-c	Net Ea.
4	600	\$0.71	2	1500	\$1.20
6	600	.79	8	1000	1.49
8	600	1.19	6	1500	1.79
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2	1000	.71	8	2000	3.75
4	1000	1.19	2	2500	3.25
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BC-454-B 3- 6 MC \$5.95  
BC-455-B 6-9.1 MC each

XMTRS Furnished with 4 tubes, including 1629 magic eye, 1626, and 2-1625's; also calibrating crystal.

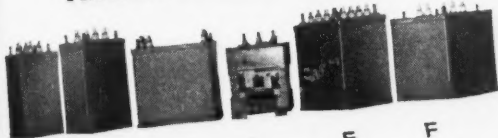
BC-696-A 3-4 MC 9.95  
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3B24	.75	874	1.95	9008	1.05
3BP1	3.00	923	.45	9004	.90
5BP4	3.37	931A	1.87	9006	.60
6AK5	.90	1619	.75	832	2.25
6C21	13.50	1624	.90	(VT118)	
8005	\$3.15	1625	.75	826	2.25
801	1.72	1626	.60	(VT222)	
803	9.00	1651	.75	2X2A	.60
807	.90	957	.75	815	2.25
809	1.79	9002	.90	(VT287)	
				3E29	3.00

3C24 (HK24G) 90c each  
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(Continued from page 88)

MAQ can be heard on 28-Mc. 'phone and I believe it is f.m. The 3.85-Mc. 'phone boys known to have handled Florida traffic are: AZT and CEL. On the c.w. nets were HMG, LJJ, MAP, HJR, and CXE. Do you have a working net in your city, and is it tied in with the nets of the State? Your SCM will be glad to answer any inquiries concerning emergency nets or official appointments.

**VIRGINIA**—SCM, Walter R. Bullington, W4JHK—The Virginia Net got off to a good start Sept. 29th with IA as NCS. The Net meets Monday through Friday at 7:00 p.m. on 3680 kc. and anyone in Virginia is invited to meet with us. Traffic-handling is the main objective but a get-together is usually had when QNF, MQX, in Sandston, was 5HPT and was 'phone SS winner in 1947. Glad to have you with us, OM. IWA has a new jr. operator, a YL. MK is on 7-Mc. c.w. evenings with an HT-17. KYD is impressed at how well IA has handled the Virginia Net. We all are, "Bus." LMS and JGW are at William and Mary, the latter a professor. WT has remodeled his SCR-522 for 144 Mc. JOT is rebuilding with more power and a beam on 28 Mc. AGH is rebuilding his 3.5-Mc. 'phone and monkeying with his SCR-522 on 144 Mc. CLD is doing some short skip work on 28 Mc. and a little regular work on 3.85 Mc. KFT scheduled 80ZA during the VFW Convention. KYD has a new Bud VFO. IHN is back on 3.5 and 14-Mc. c.w. FV is active on both Virginia nets, 'phone and c.w. KFC attended the Hudson Division Convention. KSW blew his plate transformer but is back on with a Supreme AF-100 and a 129-X receiver. BZE has a new HQ-129X receiver. KDY is SEC for Virginia. KAO is PAM. RMs are KYD, BZE, and IA. Traffic: W4IA 32, KFC 18, BZE 11, FV 8, JHK 5.

**WEST VIRGINIA**—SCM, Donald B. Morris, W8JM—MARA elected following officers: GBF, pres.; KWI, vice-pres.; YGL, secy.; Al Matthews, treas.; and FMU, act. mgr. MIS is NCS of West Virginia 'Phone Net meeting on 3911 kc. at 4 p.m. on Sundays with permanent frequency and time to be decided later. MOP attended Charlotte Hamfest and DFC visited hams in Florida. PQQ has weekly schedule with ØTKK/VK9. BOK, FMU, and KWI, West Virginia ECs, made a good showing in the October Emergency Tests. GBF, besides being president of MARA and RM and NCS for West Virginia, finds time to conduct code classes three times a week at his home. The West Virginia Net, on 3770 kc., needs outlets in Huntington, Parkersburg, and Wheeling. KVARA activity continues quite high with a lot of activity on 144 Mc. JM received WAC and WBE certificates. MARA and KVARA have appointed delegates to State Radio Council and would like to hear from other interested clubs. JM leads in the WACVW Contest, followed by GBF, KWI, and FMU. Any of the above stations would like to know of amateur activity in Morgan, Jefferson, Logan, Boone, Mingo, Putnam, or Ritchie Counties. Traffic: W8PQQ 12, GBF 11, JM 10.

#### ROCKY MOUNTAIN DIVISION

**COLORADO**—SCM, Glen Bond, WØQYT—The Western Slope Radio Club is getting into the swing of its fall and winter activities. The Club now owns two SCR-284A emergency rigs. Two new hams have moved to the Valley, Russ Smith, 6ONK, and Thad Newhouse, 7KIW. GKW has been appointed Emergency Coördinator. SJT is packing the mail. FQT has an SCR-522 that will be on the air soon on 144 Mc. GDC, in Fruita, does a little garage work between QSOs. PXZ is trying to get the exciter for his new 28-Mc. rig going between shifts at KFXJ. LZY, in Colorado Springs, is handling traffic on 3700 kc. and looking for some net outlets in other states. FPZ made a nice DX contact with his 15-watt mobile rig—J8ACS, ex-ØFAN, of Denver. AAB worked two G stations on his mobile rig Oct. 6th. KVD, of Colorado Springs, was in Denver Oct. 3rd and made some schedules for his emergency net test Oct. 11th and 12th. That net is going to town under "P.A.'s" direction. WYX had The Electron Club members as his guests on Squaw Mountain, altitude 12,000 feet, on Oct. 10th. Bob is building a radio relay lab. up there and hopes to have the building finished next summer. IQZ is rebuilding but will be on soon with 250 watts. FPZ is the Section Emergency Coördinator. Let's all give Hank a hand and get some more emergency nets going. The Bell Radio Amateurs held a picnic on Sept. 14th. Emergency equipment for car and home was the main topic. Traffic: WØLZY 8.

**UTAH-WYOMING**—SCM, Alvin M. Phillips, W7NPU—UPI and SP are burning a path on 144 Mc. between Sal-

(Continued on page 94)

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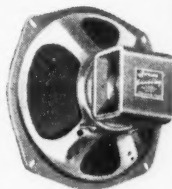
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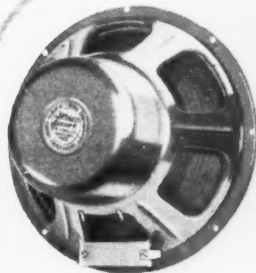
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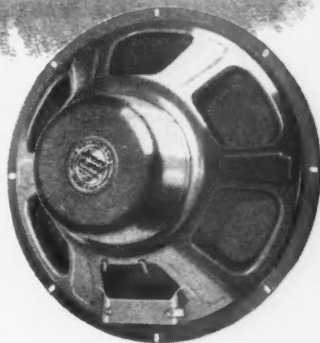
6-Inch  
P6-TH



8-Inch  
P8-SH



12-Inch  
P12-SH  
P12-NH



15-Inch  
P15-NH  
P15-SH

\*See Catalog 1010 for complete listing of single radiator and Coaxial extended range speakers, reproducers and systems, ranging in price from \$5.00 to \$1,500.





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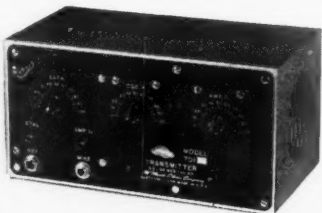
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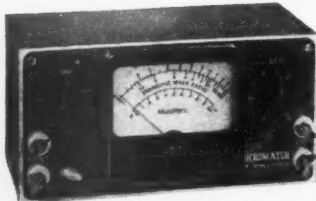


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(Continued from page 92)

taire and Ogden. FST reports the reactivation of the Farm Net. MQL has resigned as Ogden area EC because of pressing work. We lost an FB RM when BED moved to Nevada. GBB is working lots of traffic and is looking for outlets in Ogden and Salt Lake. JHL reports in the *Shy-Wy Club News* that the club's picnic has been delayed because of bad weather. The Cheyenne boys who are working for United Air are sweating out transfers to San Francisco. Some have resigned. JET already has been transferred. WLA has gone to St. Joseph, Mo. UOM is up to 67 countries and 27 zones in his climb on the DX ladder. KHI is working traffic in the Wyoming Net on 3760 kc. KIY is on 7 Mc., escaping 3.5-Mc. QRM. DAD is having fun with his QRP rig on 7-Mc c.w. UTM is moving traffic in the Pioneer Net Mon. through Fri. at 8:00 p.m. and shifts to 5LSN the same nights at 8:30 MST. JHH is rebuilding. JVV still knocks them off in the Orient. JQU reports activity in Logan will increase when school starts. Anyone interested in traffic and emergency work, please notify the SCM. Traffic: (Aug.) W7UTM 15. (Sept.) W7UTM 201, UOM 10, KHI 3.

### SOUTHEASTERN DIVISION

**ALABAMA** — Acting SCM, Arthur W. Woods, W4GJW — GJW invites inquiries concerning EC, nets, activities, etc. KCQ has been appointed SEC. FSW is chairman of a statewide clinic for BCI elimination and instructions. UL did excellent work on 3.85 Mc. during the hurricane using emergency gas-driven a.c. generator. BMM returned to 3.85 Mc. BFM has rig, shack, and antenna. EBZ has new HRO-7 and new VFO. DID has new buffer driver stage using 257-B. The Birmingham Amateur Radio Club, CUE, has completed new rig ending with p.p. 75Ts Class B modulated for all bands. The first postwar Alabama QSO Party will be held Jan. 4th from 2:00 to 4:00 p.m., the first hour being for same-band operation, the second for cross-band operation. Score as follows: 1 point for same-band, same emission; 2 points for same-band, c.w. to 'phone or vice versa; 2 points for cross-band, same emission; 3 points for cross-band, c.w. to 'phone transmissions. BA has been appointed PAM and ATF RM, heading up an Alabama Emergency Net, and both directly subordinate to the direction of KCQ. AUX has acquired one of those surplus Federal marine transmitters using p.p. 813s for his own use. Please write to KCQ concerning emergency or traffic work.

**EASTERN FLORIDA** — SCM, John W. Hollister, W4FWZ — This year's hurricane emergency did not find Florida lacking in net preparedness. Many amateurs operated continuously and under the most difficult and hazardous conditions. Deland: WS reports emergency-conscious Red Cross arranging for power generator. Gainesville: At the University are the following: HRB, IJE, IID, JOL, JAS, MBQ, EZT, EID, EPT, KCR, JPX, KKM, and FRG. Gator Club officers are: HRB, pres.; IID, secy-treas. Lake City: IQV sent in a good traffic report on his and NN's activities on 7180 and 3910 kc. during the emergency. Lake Worth: LJS reports 200 messages handled during the emergency by the radio club with 50 hours on emergency power by FCA on 3910 kc. and GGL on 7 Mc. with help from JLN and CNT. Miami: ES did a bangup job as NCS and sent in a fine report on traffic. ES held down the hot corner on 3910 kc. for the Florida Emergency Net with help from members of the USCGA Shore Net. BYF, EC, coordinated activities with CGA and the Red Cross. BI handled heavy traffic, as did FPK, GOG, and FCL. Filling in at ES were JIS, AKI, NR, BXL, and E. G. Bishop, USCGA. Orlando: The radio club officers are: DQA, pres.; AKF, secy.; QN, treas. GJO, GIY, and QN are the big wheels on 50 Mc. and took full advantage of the E-layer skip. Palm Beach: GJI did a fine job on the USCGA net with weather reports although hampered with fire damage to the final. Tampa: GEE did outstanding work in getting the 7180-ke. net functioning. PB, on the 3910-ke. net, did excellent work. West Palm Beach: JQ, our SEC, now is equipped with emergency generator. Jacksonville: DU, JKI, IVX, ATM, GIP, and K4NR handled the heavy stuff in and out. Traffic: W4IQV 993. GOG 247, DQW 75, FSW 50, IKI 42, AYV 33, BT 30, AAR 3.

**WESTERN FLORIDA** — SCM, Luther M. Holt, W4DAO — RM: AXP, GUH and BJF have new 28-Mc. beams. EZV, KYJ, and EGO are building 50-Mc. rigs. MFY added a pair of 813s. LRX is Justice of the Peace. CDE works 14-Mc. DX. QG is building 7-Mc. rig. Participants in recent hurricane emergency work included JV.

(Continued on page 98)



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**MEASURABLE CHARACTERISTICS CURVES IN 15 SECONDS  
INCLUDING BOTH POSITIVE AND NEGATIVE GRID REGIONS**

Watch the operator manipulate quickly the switches and knobs of this new Hytron electronic curve tracer. Like magic, graduated horizontal and vertical scales flash onto the screen, and he calibrates them in desired units by adjusting the marker pips. Effortlessly, he traces the three basic characteristics curves ( $E_b-I_b$ ,  $E_b-I_{c1}$ ,  $E_b-I_{c2}$ )—for a quick check or a photographic record. No slow tabulating and plotting of dozens of meter readings.

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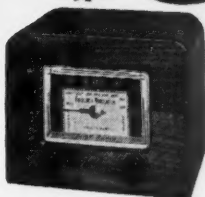


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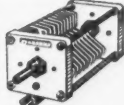
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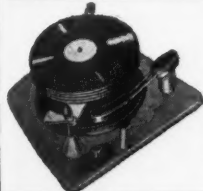
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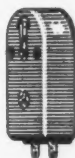
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NC-173T, With Speaker	189.50	37.94	13.39
HRO-TT, W/Power Supply	299.36	59.87	21.16
NC-240DT, With Speaker	241.44	48.36	17.06
NC-46, With Speaker	107.40	21.48	7.59
<b>HALLIDAY</b>			
S-40A, Receiver	89.50	17.00	6.33
SX-42, W/R42 Speaker	304.50	60.90	21.52
SX-43, AM-FM-CW, Less Speaker	169.50	33.90	11.98
S-47, AM-FM, Less Spkr.	200.00	40.00	14.13
<b>HAMMARLUND</b>			
HQ-129X, W/Spkr. in Cab.	189.15	37.83	13.37
SPC-400X, W/Spkr. in Cab.	398.25	79.65	28.14
<b>R. M. E.</b>			
UHF-152, H. F. Converter	86.60	17.36	6.11
RME-84, Recvr. Compl.	98.70	19.74	6.97
RME-45, Recvr. Compl.	198.70	39.70	14.04
DB-22A, Presselector	68.00		

### TRANSMITTERS

<b>HALLIDAY</b>			
HT-9, 100 Watt Xmtr	350.00	70.00	24.67
HT-17, W/40m coils, 17 Meter	79.50	15.90	5.62
HT-18, Var. Master Osc.	110.00	22.00	7.77
<b>HAMMARLUND</b>			
Four-20, C-W Xmtr	120.00	24.00	8.48
Four-11, Modulator	72.50		
<b>SUPREME</b>			
AF-100, 100 W. Xmtr	550.00	110.00	38.88
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75-GA, 75-100 W. Phone/CW	495.00	99.00	34.98
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<b>JOHN MECK</b>			
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<b>R. C. A.</b>			
155-C, 3" Oscilloscope	115.00	23.08	8.11
195-A, Volt Ohmyst	79.50	15.90	5.62
162-C, Channelyst	162.50	32.54	11.48
WV-75A, Volt Ohmyst	125.00	25.04	8.83
WO-79A, 3" Oscilloscope	550.00	110.00	38.88
<b>McMURDO SILVER</b>			
-906, AM-FM Sig. Gen.	99.50	19.90	7.03
<b>PRECISION</b>			
10-20P, Tube/Bat. Test, V/Ohm	109.10	21.82	7.71
10-12P, Elect. Tube Master	86.15	17.23	6.09
E-200C, Sig. Generator	64.15		
<b>SYLVANIA</b>			
131, 3" Oscilloscope	79.50	15.90	5.55
132, 7" Oscilloscope	124.50	24.90	8.80
134, Polymeter	69.50		
140, Port. Tube Check	79.50	15.90	5.62
<b>HICKOK</b>			
288-X, Sig. Generator	159.06	31.86	11.23

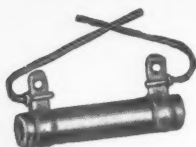
\*Includes only 6% per annum carrying charge





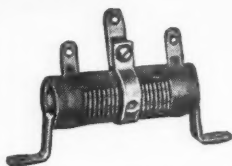
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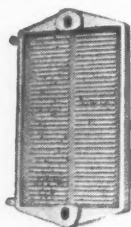
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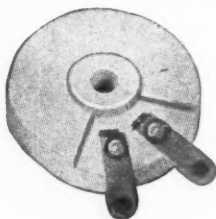
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(Continued from page 94)

AXP, ACB, MS, LT, CNK, EQR, LCV, IPV, MAX, TL, LDT, and FVJ. HJA works 3.85-Mc. 'phone. IPV and LT visited Pensacola. AXP added an R-9er. QU erected a 7-Mc. antenna. GWY/EQZ built an FB preselector. MEN added a pair of TZ20s. FDL bought a new receiver. AOK is a new-comer to the section. Welcome, OM. DZX, MS, EGN, and DAO operate 14-Mc. 'phone. JNP set up an emergency station in his store during the hurricane, assisted by UC. FHQ is talking about modulator equipment. DXQ works 7 Mc. exclusively. LUF has an FB shack in his store. MCL is new Tallahassee call. GAA operates from LDT. Traffic: W4AXP 38, MS 10, CNK 6.

**WEST INDIES** — SCM, Everett Mayer, KP4KD — AM moved to Rio Piedras and worked all districts except the 6th on 28-Mc. 'phone with 4-wave vertical sitting on the ground. BE is sporting a new VFO made up of combination parts from BC-457A and 458A. NY4CM has 45 watts on 'phone, and added VU and YA to his DX bag. JA works KH6 on 14-Mc. 'phone. FH worked SV for new country on first 14-Mc. 'phone contact and added PK6 and J9 to his DX list. DV operates on 14,106-ke. c.w. and 14,201-ke. 'phone. AK works such DX as YI, CN, KH, PK6, EK, J9, and VS7. EZ is going good on 28-Mc. 'phone. BJ is using VFO now, and added VS2 and VS7 to his DX bag with his p.p. 813s. 2SW has new Super Pro. 2BT is on 28, 14, and 7 Mc. with 300 watts. New Officers of the PRARC are: 4CL, pres.; 4DP, vice-pres.; 4BA, secy.; 4BL, treas.; and BG, BJ, CV, DY, and JA, directors. Traffic: NY4CM 25, KP4AK 11, 4KD 6.

## SOUTHWESTERN DIVISION

**ARIZONA** — SCM, Gladden C. Elliott, W7MLL — NGJ has a surplus marine rig on 3.85 Mc. JGV is on 28 Mc. with 150 watts at Eloy. JPY passed the word along to waiting father in Guam one minute after the atork arrived. SBN has a new 9-tube speech amplifier with de luxe clipping. JMS and OAS are going up into the top power class. 5GGM and 5NAF are on 28 and 7 Mc. at Benson. QMG is on 28 and 7 Mc. 9BDE is located in Tucson and has 200 watts on 14 and 3.85 Mc. PBD has worked all Hastings NZ Certificate No. 1. DFE is building a new rig around an e.c.o. LHS is on 3.85 Mc. at the U. of A. CDF is getting out with a new Premax beam on 28 Mc. LHY is on 28 and 7 Mc. New Phoenix calls are NAP, LID, and LNE. LNT has a Meek rig on 28 Mc. UW worked WAC in 2 hours and 20 minutes on 14-Mc. c.w. JMQ worked 16 states and a ZL on 3.85 Mc. in 16 hours of continuous operation. PEY has 75 counties with a Meek 60-watt rig. JYZ runs 500 watts on a pair of 812s for break-in c.w. on 7 Mc. New Tucson calls are LOC, Kephart; LOJ, Otto; and LON, Fisher. UOG has a new rig using clipping and a pair of T55s on 28 Mc. GV is contacting his daughter on Guam, with 150 watts on 28 Mc. The 3515-ke. net meets at 9:30 P.M. daily.

**SAN DIEGO** — SCM, Irvin L. Emig, W6GC — Asst. SCM and SEC, Gordon Brown, 6APG. New ORS/OPS is NF/CFN and LUJ is new ORS. VJQ reports AIF is a new ham with both VUK and WXK's XYLs up for license. 8WMT visited W6 Land from Detroit. During the Florida storm FGU, MI, APG, VJQ, and WZL did yeoman work handling traffic from the stricken area. A new 50- and 28-Mc. EC net consists of JUM, KD, JRM, HRI, VI, VOS, FSH, FVQ, and APG. A new 7-Mc. EC net soon will be formed. The L.A. Council of Radio Clubs' picnic at Santa Ana was a huge success with 700 attending. TMI took home the HRO-7 door prize. NF/CFN reports the American Legion Net is being reorganized and interested amateurs may contact QUF at Colton or CFN at Santa Ana. LUJ keeps schedule with 6YOT/C6 on 14 Mc. CNQ sends a nice report from Calexico. RDI works 28 Mc. with 9 watts. DWA has a new Tempco 75-GA. ZWY, VKN, and UYA are active on 28 Mc. DHP vacationed in Oregon with BC-474. NGN, VKA, and IZ are working 144 Mc. for all it's worth. QG expects to be on 7 Mc. soon. LKB, ex-3LKB, is giving 7 Mc. a whirl. BAG has a new SCR-522 and new jr. operator. BWO won LM frequency meter at Orange County Club meeting. MQF is dividing time between midjet races and 14-Mc. 'phone. DEY considers 144 Mc. low frequency and now is operating on 420 Mc. ECV, UEF, PHJ, and ZWL are heard on 7 Mc. JQB, of Santa Ana and Lone Pine, now is now operating on 420 Mc. ECV, UEF, PHJ, and ZWL are heard on 7 Mc. JQB, of Santa Ana and Lone Pine, now is communications assistant at ARRL Headquarters. AHQ now is 9COC at Denver. Reports say the BC-474s make a

(Continued on page 100)





*Happy Christmas*

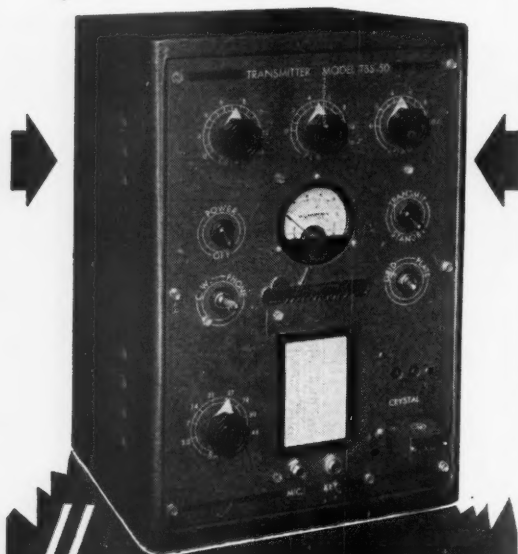
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(Continued from page 98)

very fine 7-Mc. rig with minor modifications. The Orange County Club meets the 3rd Wednesday of each month at Episcopal Church, Santa Ana. The San Diego Club meets the 1st Monday of each month in Federal Bldg., Balboa Park, San Diego. More activity reports would be greatly appreciated by the SCM. Traffic: W6VJQ 75, MI 71, APG 70, LUJ 44, CNQ 26, NF/CFN 4, VTV 1.

### WEST GULF DIVISION

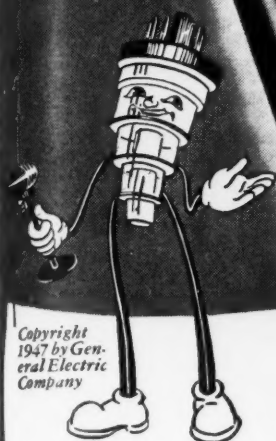
**NORTHERN TEXAS** — SCM, N. C. Settle, W5DAS —

Your guest reporter is APW. DAS helped the Gulf Coast boys during the emergency. DVQ and QA rigged a neat patching circuit to enable our Director's mother, in Abilene Hospital with a broken hip, to talk via land line and ham radio to her son, NW, in Odessa. CC tries a new type antenna each week and can't decide on permanent sky hook. The Dallas Club pulled a nice picnic at a local park. ECE is fitting from one GI radio school to another. APW has wheels and dials of ART-13 blowing and going. ØTGL is back on the air from home QTH, Des Moines. GYW works 3.85-Mc. 'phone from Wichita Falls but reports of activity from this area are lacking. The 5th district has seen ample reasons this year for emergency and disaster training and operation. If you don't belong you had better join the AEC and rig up emergency gear. KOW and WV report the West Texas crop of babies also is good this year. The East Texas boys are not causing as much QRM on the bands lately. What's the matter, guys? Looks like we took a trimming on the 20-meter band but the new 15-meter band out of Atlantic City Convention sounds very good. The new fall operating season is in full swing. Plenty of surplus military gear has been converted, so let your SCM have those activity reports, gang. LSN spent 52 hours of traffic during the Florida emergency. NTX Net meets three nights per week. Traffic: W5LSN 325, CDU 100, GZU 46, MXV 45, ASA 12, BBH 12, ILZ 12, DAS 10.

**OKLAHOMA** — SCM, Bert Weidner, W5HXI — Asst. SCM, George Bird, 5HGC. EC: AHT. The Stillwater Club had a Bar-B-Q at which some 30 hams and their families attended. CEZ is in N. Y. C. for special work before going to Lake Charles. The Lawton-Fort Sill Club has organized with HXU, pres.; ISE, vice-pres.; FEC, act. mgr.; FWX, treas.; IGO, secy. The OCARC elected officers as follows: BBS, pres.; HXQ, vice-pres.; DG, treas. MEN, secy. EHC is on 3.9 and 14 Mc. The CAA at Oklahoma City has four active hams: AGM, BKN, EHC, and HEV. HXT now is in Louisiana. APG has his 813 on 3.9 Mc. DWG has 100 watts n.f.m. on 28 Mc. The Enid Club will entertain the Stillwater Club, having lost on Field Day score. AHT reports six counties organized for emergency with thirty member stations. Let's hear from the other seventy-one counties. OLZ has operated all summer and now is showing new life with plenty of traffic. The Oklahoma 'Phone Net operates each Sunday at 8:30 with some thirty stations on the roll. The Bartlesville Club held a special meeting for AHT to explain the emergency set-up. HGC represented the 'phone net.

**SOUTHERN TEXAS** — SCM, Ted Chastain, W5HIF — SEC: HQR. PAM: EYV. The San Antonio Radio Club now has a monthly paper, *Gutter Dope*. The club station call is W5SC; GKI is trustee of the station. HHO, HLK, and HHN are off to college classes. JLY has worked four countries on 50 Mc. NNN reports the Texas A. & M. Radio Club met and elected the following officers: JJO, pres.; LNB, vice-pres.; HZB, secy.-treas. The club has three transmitters: one kw. on 3.85 Mc., a BC-610D on 7 Mc., and 170 watts on 28 Mc., will have a 522 on 144 Mc. shortly, and will be looking for 144-Mc. contacts. LUJ is now in San Antonio. HZJ announces the arrival of 20-w.p.m. Code Proficiency Certificate. AQN lost antennas during the recent storm, but has new power supply and is busily grinding crystals for 7 Mc. KSW has 2-kva. power plant and SX-42 and 813 with 200 watts c.w. all bands. MWN has new VFO and 500-watt transmitter. EWZ has new 28-Mc. rotary. NIY is new ORS and works 3.5 and 28 Mc. IRJ is ORS. New OPS is FNY. DAA thinks South Texas needs a good traffic net — so do I. How about it, fellows? The Rio Grande Valley International Radio Club had a field outing to test emergency equipment; attendance was 100 per cent. IAL furnished the receiver; KSW a 28-Mc. 'phone; BAJ a 2-kw. power unit. ACL has new p.p. 813 final. KZT had a visitor, CE3FW. Relative to any emergency which might occur requiring use of the W5AAF emergency mobile unit, the following persons should be contacted in the order listed: Lt. Col. W. W. Downs.

(Continued on page 108)



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METAL TUBES

## KEN-RAD Radiogram

### Lighthouse Larry Comments:

**A**ND NOW some thoughts on metal audio-amplifier tubes:

The purpose of a receiver is to produce audible sounds. Once the received signal has been stripped of its radio-frequency components, the audio component must be amplified up to the point where it can be heard. This job is performed by audio-amplifier tubes, in conjunction with your loud speaker.

First stage of amplification customarily is taken care of by the triode section of the second detector tube. Typical of metal duplex-diode triodes are the 6SQ7 and 6SR7. Either tube, as a general thing, will drive your Class A output stage, but for resistance coupling preference must be given the 6SQ7 because its triode section has a higher amplification factor (100 as against 16 for the 6SR7).

Proceeding to the Class A output stage, we find that good practice usually dictates the choice of a pentode or a beam power tube, since these designs give a high power output with low grid-driving voltage. Suitable types for the job are the 6F6 pentode or the 6V6 and 6L6 beam power tubes.

The edge lies with beam power tubes, because of their greater efficiency due to the beam construction. This results in a much

lower screen current than is possible with a pentode such as the 6F6. If we go on from there to exercise a choice between the 6V6 and 6L6 beam power types, we find that choice to be based almost entirely on the power output desired. The 6V6 will deliver somewhat more than 5 watts and the 6L6 approximately 11 watts.

And let's not over-estimate Class A output power requirements! It is interesting to note that *one watt* of power gives a comfortable listening level in the average-size room.

A final comment on metal tubes in amplifier service may prove helpful. You will find that the amount of grid resistance you can use in your circuit necessarily is limited. Maximum resistance should be 0.1 megohm if fixed bias is employed, and 0.5 megohm for cathode bias. The reason is, to avoid a progressive increase in negative grid current, which may go into a runaway condition and "blank out" the tube.

Any further points you would like cleared up on the choice of tubes for audio-amplifier service? The efficiency of your rig depends largely on your tubes and how you use them. Ken-Rad metal tubes are *right*... and my job is to help you select the *right* tube for each application. Let me hear from you whenever I can be of help!

*Lighthouse Larry*

178-F12-8850

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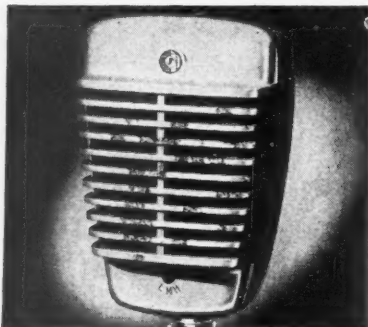
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(Continued from page 100)

Kelly Field, Ext. 6183 or 5487; Capt. Chester B. Lewis Kelly Field, Ext. 6393 or 5084; Capt. W. F. Casey, Kelly Field, Ext. 6115 or San Antonio T1877. The mobile unit SCR-339, 600 watts 'phone or c.w., any frequency 144-18 Mc., is available at any time. The STEN is to be complimented on the splendid way they kept the Net available for traffic and steered clear of the restricted frequencies during the Florida and Louisiana Hurricane emergencies. KZT has 110 countries. JWM is building a new beam. Traffic: W5MN 532, JPC 35, KZT 25, HQR 9, MKL 5, HZJ 2, AQN 1.

NEW MEXICO — SCM, J. G. Hancock, W5HJF — SEC is ZM/ZU. KWR is new EC for Santa Fe. KAO is new OO. The new C.W. Net had a bad start on Sept. 15th when Net Control HJF's oscillator refused to follow the key, but the net is rolling better all the time and should develop into the net it was prewar with ZM, VN, CTP, DVH, GXL, HJF, JAR, KWP, KWR, LAJ, LZD, MFQ/MXF, MMX, and MOX reporting in CTP, MFQ/MXF, and ZM have had 100 per cent attendance so far. HJF arranged for a couple in Portales to talk via J3GNX on their golden wedding anniversary with their son stationed in Japan. MFQ, National Radio Club station, recently got on with 150 watts to a pair of 809s and operates 3.5- and 7-Mc. c.w. with MXJ at the key. JYW is working DX on 7- and 14-Mc. c.w. and claims CMs, VKs, ZLs, XEs, and VEs the past month. CTP is now active on 3.5-Mc. c.w. as well as 7-, 14-, and 28-Mc. c.w. and 28-Mc. 'phone. LDI has moved to Ramah and is working 28-Mc. 'phone with 55 watts. MOJ is quite active on 7- and 14-Mc. c.w. with 50 watts from Roswell Army Air Field. ND is operating c.w. 3.5 through 28 Mc. and n.f.m. on 28 Mc. from Orange, Tex. ND's jr. operator is 4LFE at Arlington, Va. Traffic: W5HJF 14, ZM 8, MFQ/MXF 4, CTP 2.

### CANADA MARITIME DIVISION

MARITIME — SCM, A. M. Crowell, VE1DQ — SF has consented to assist in furnishing news of interest on HARC. AW has joined the HRO ranks. EP is leaving for VO6 Land. FB expects to continue with the RCN permanently. FQ is not quite satisfied with the new 14-Mc. beam. GR had modulation transformer trouble and now is using grid modulation. LL is selling out. LZ is in the throes of reconstruction. MZ is back on 14 and 3.8 Mc. NQ is going in for v.h.f. work. PB has been giving 28-Mc. 'phone a whirl. QS has a VHF-152 converter. There will be wedding bells for TH in the near future. OB has a new BC-348. NE has added a converter for 28 Mc. to his BC-348. ES, formerly on 14-Mc. c.w., now is on 28-Mc. 'phone. FO, the HARC station, has added a new BC-348 receiver. HP had the misfortune to have his shack entered by burglars and lost some valuable gear thereby. ET is knocking 'em off with the new 28-Mc. three-element beam. HV has joined the RCAF and expects to have a VE3 call shortly. CR recently dropped in from Sydney for a visit with the local gang. Reg reports some choice DX on 14-Mc. 'phone coming his way. RP handled a QRR message from VO with the reply placed in VO a few hours later by DQ.

NORTHWEST TERRITORIES, BAFFIN ISLAND (Special report) — MJ reports as follows: MK, MM, MO, and MR left the area a year ago. MQ, MT, and MJ have continued to do business. New-comers are ME, MF, and NW at Clyde River; OD at Pangnirtung; and OG at Cambridge Bay, Victoria Island, Western Arctic. NW is our technical expert. NW has the best record for DX, having worked pretty well all over the globe on both 14 and 28 Mc. His power is around 250 to 300 watts input. MQ ran a test with MJ before he knocked his rig down for shipment to Ontario. MJ's input is 40 watts from vibrator power supply and his best DX was VK3VJ, Australia, who gave an RST 569 report. The Clyde River gang, ME, MF, MQ, MT, and NW, have held regular bi-weekly 3.85-Mc. 'phone schedules with MJ and OD at Pangnirtung. NW and OD are the only two Baffin Island stations which definitely will be in operation this coming winter.

### ONTARIO DIVISION

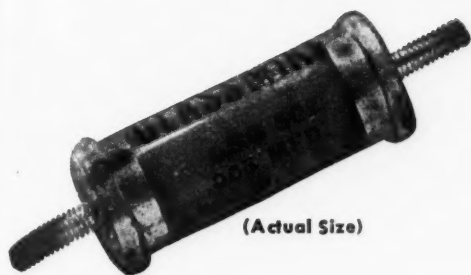
ONTARIO — SCM, David S. Hutchinson, VE3DU — This is going to be the slimmest report that I have yet sent in because of the laxity of the boys in not reporting on time or not reporting at all. HP says pressure from work

(Continued on page 104)



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<b>LSG101</b>	.0001	1 $\frac{1}{2}$ " x 1 $\frac{1}{16}$ "	.03	.09	.31	.94	<b>1.50</b>
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<b>LSG501</b>	.0005	1 $\frac{1}{2}$ " x 1 $\frac{1}{16}$ "	.15	.5	1.6	3.0	<b>1.50</b>
<b>LSG102</b>	.001	1 $\frac{1}{2}$ " x 1 $\frac{1}{16}$ "	.31	.94	2.5	4.5	<b>1.70</b>
<b>LSG202</b>	.002	3 $\frac{1}{4}$ " x 1 $\frac{1}{16}$ "	.62	1.9	4.5	7.0	<b>2.45</b>
<b>LSG502</b>	.005	3 $\frac{1}{4}$ " x 1 $\frac{1}{4}$ "	1.6	3.1	6.0	7.0	<b>3.50</b>
<b>LSG602</b>	.006	2 $\frac{3}{4}$ " x 1 $\frac{1}{16}$ "	1.9	3.5	6.2	7.0	<b>3.75</b>
<b>LSG103</b>	.01	2 $\frac{3}{4}$ " x 1 $\frac{1}{4}$ "	3.1	5.0	7.0	7.0	<b>4.25</b>

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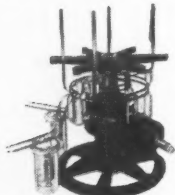
Ready-to-assemble kit includes: Rotator with mounted Inductostub assembly, direction indicator, center section, elements and insulators with all hardware ready for installation.

See your jobber, or write direct for complete data.

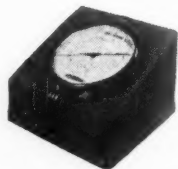
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(Continued from page 102)

and home affairs is making radio difficult for him. ATR got his WAVE certificate for 3.5 and 7 Mc. and also has WAS for 7 Mc. Nice going, Reub. CY is new member of the QBN. Anyone know the whereabouts of TM and OI, fugitives from QBN? Glad to hear AWJ, ATR, CY, WX, SF, BME, BCS, BMG, HP, and XO, all active on Beaver Net. Your SCM will be with you shortly, boys, to hold up the London end of the net. BCS schedules GN and GG daily. Congrats to BMG on being elected president of the Hamilton Club, with BNQ, vice-pres.; and Herb Nelson, secy. VD is looking for traffic men on 7 Mc. KM reports the ham emergency net meets every Tuesday at 7:15 p.m. Congratulations are in order for QK, who announces the arrival of a jr. operator, Roderick Christopher, on July 4th. Jon will be on 3.5 Mc. for schedules. CP is busy getting the 'phone net lined up again, and is endeavoring to sponsor Ontario 'Phone Contest. Your SCM, while on vacation, dropped in on VE2BE and 2LC. BLD, BMZ, WM, AHP, YJ, WP, and GB are active on 28 Mc. in the London area. HI is working the VKs on 14 Mc. and gets on 28 Mc. occasionally to get his quota of DX. The Border Cities had a dinner meeting on Oct. 6th at Norton Palmer Hotel, with W8DPE and W8SCW as guests. New officers of the Peterboro Club are as follows: AXQ, pres.; BCE, vice-pres.; ABW, secy.-treas.; and AMM, activities manager. New hams in Peterboro are BNZ, BOI, BRC, and BTJ. Let's see those reports in on the first of the month, gang. Traffic: VE3HP 50, WX 29, BCS 24, ATR 19, DH 13, BMG 5, CP 5, KM 4, SF 3, VD 3.

### QUEBEC DIVISION

**QUEBEC** — Acting SCM, Gordon A. Lynn, VE2GL — On Oct. 3rd CA worked his 100th VK since June 23rd. WW has 100 watts to 4D32 on 14- and 28-Mc. c.w. and is reported erecting some rhombics. ZZ and TA are finding response to Emergency Corps call for assistance very slow and would like to hear from more of those who can participate. JJ, GK, and OG had VP6YB and his XYL as visitors. ZM is ex-VO6L and is flight radio operator with airline. He has paid several visits to GM4PW. GK is building a summer house near LJ but finds time to work DX. WF has new four-element beam excited by a pair of 813s in Class B linear. TY worked his first VK on 14 Mc. WF and OG had W2IQQ as visitor. UJ did an FB job on his rig and rotary beam. QQ has new cabinet for rig. LO is a new ham on 7 Mc. in Drummondville. EC schedules OD, RM, JZ, and QJ daily in addition to net. DU is rebuilding and has new AR-77 receiver. RZ has renewed activity on 50 Mc. XX and HH have new rigs doing FB job. TH abandoned 304TH for 833A but still has bugs. SG has new motor on his beam. EX now has two rigs, one 40 and one 500 watts, plus an AR-88 receiver. OS rebuilt and is looking over 50 Mc. AAH is on all bands A3. DX is going strong on 3.8-, 14-, and 28-Mc. 'phone. EC has applied for OPS appointment. Results of the St. Maurice Valley Radio Assn. elections are: DD, pres.; QA, vice-pres.; EC, secy.-treas.; QL, QJ, and OD, counselors. Send a postal card about your activities. Traffic: VE2GL 17, EC 12, ZZ 10, CA 2.

### VANALTA DIVISION

**ALBERTA** — SCM, W. W. Butchart, VE6LQ — MC, UT, and FZ keep 14-Mc. c.w. hot in Edmonton. TM, AO, and GD are known as the DX Kids down in Cowtown. TM says they have taken to burying their antennas to make working DX a bit tougher! LQ has WAC. EY installed Selsyns on beam position indicator. BW has become a firm believer in low power. He runs 40 watts to RK39 final on all bands. YN purchased high-voltage power supply. BY has pair of 811s final. IR purchased BC-312. WS developed "beam trouble" during high wind recently. MJ is collecting parts for his 28-Mc. beam. HM has left on an extended trip through Eastern Canada and the States. He will visit ARRL Headquarters while in the East. We hear lots of the 28-Mc. gang working TA, KU, MP, and LL! EA is building photo-flash high-speed flash unit. EF has gone to Varsity. 8MI visited Edmonton while holidaying from Yellowknife. IE, of Calmar, has a recording unit. HY is kept busy in the North with RCCS. He manages to get home for week ends when a plane is available. LW lights up the lights in his QTH whenever he presses the key! TK, of Calgary, keeps 3.85 Mc. occupied most evenings. SZ worked Palmyra Island recently. JG hit 28-Mc. 'phone a few weeks ago.

**BRITISH COLUMBIA** — SCM, W. W. Storey, VE7WS

(Continued on page 106)

Below: Four H & K Dual Diversity Receivers for frequency shift reception of high speed Radiotype transmissions from Manila, Shanghai, Honolulu, and New York in operation at Skyline Receiving Station of Globe Wireless, Ltd., near San Francisco.



## H & K FREQUENCY SHIFT EQUIPMENT

### Improves Signal-to-Noise Ratio by as much as 22 Db.

As compared to "make-break" keying systems, Heintz and Kaufman frequency shift terminal equipment permits an improvement in signal-to-noise ratio of 11 db. by virtue of using frequency shift alone. Further gains are obtained under circuit conditions where noise and atmospheric are high. The total gain of a dual diversity carrier shift system over a single channel make-break system approximates 22 db.

### Offers High Speed Keying Without Loss of Selectivity

Selectivity is obtained with FS which cannot be approached in constant frequency systems except at very slow keying speeds. Key clicks, transients, and keying sidebands are either eliminated or kept within the pass band of the FS system. High speed telegraph tape recorders, Radiotype, or teletype can be operated with greater speed and efficiency with this equipment.

WRITE FOR ADDITIONAL INFORMATION

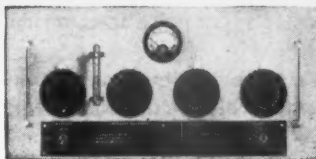
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### H & K FREQUENCY SHIFT EXCITER



Shifts the carrier around the center frequency. Shifts normally used vary from 600 to 850 cycles between mark and space frequencies. Type A-4722 exciter (above) replaces the usual crystal oscillator stage in the transmitter.

### H & K TONE TO D.C. KEYER



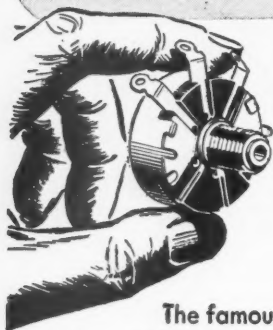
Communication services often find it desirable to transmit telegraphic impulses forming Radiotype, teletype or International Morse characters over wire lines or v.h.f. radio through the use of tone (audio frequencies) rather than direct current. The Type A-4613 Tone to D.C. Keyer is designed for such applications. Audio frequency input range is 500 to 4000 cycles. D.C. output of 50 to 55 ma. is ample for control of high speed relays.

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**IRC**  
INTERNATIONAL RESISTANCE COMPANY

(Continued from page 104)

— ME is on the air with a 100-watt transmitter using 6L6 to 809 into a C/F Zepp and new HA-129X receiver and will be quite active on 3.5 and 7 Mc. CE has worked 27 countries with his 807. XB is new call on 28-Mc. 'phone. AEB is up to 53 countries on 28-Mc. 'phone. HR has a new beam complete with electrical rotation and everything. AHT is busy building a new rig with 810s in the final. AKV is trying to get "bugs" out of parallel 807s with the help of EP. EZ, Victoria Short Wave Club, is on 7-Mc. c.w. XX's living room looks like a wholesale radio supply house. YY and KL are rag-chewing on 14-Mc. 'phone. WL is very active on 28-Mc. 'phone. RB will be on this winter with low power. AM is working DX on 28-Mc. 'phone and worked SHFTX, HRIMB, and KM6AB. AAZ is active on 3.8 and 14 Mc. AFZ has moved to Vancouver. LD, using BC-375E on 3.5 Mc., works 7 FB. XD is trying out speech clipper. GN is working 28-Mc. 'phone with 4 watts input. AJG works DX with flea power on 28-Mc. 'phone. EW (YL) is well liked by all the Victoria gang. Maybe the SCM should drop in and see this outstanding YL. IM is busy with BCI problems. MQ and WS had a get-together with W7HRV at MQ. JF is trying to get on the air with that backyard junk he has had since 1919. Totem Amateur Radio put on another Stag Party which had a tremendous turnout of hams in Vancouver. NY is back on the air with a Westinghouse GO9.

## PRAIRIE DIVISION

**MANITOBA** — SCM, A. W. Morley, VE4AM — Sorry no column last month, fellows, but yours truly was taken to the hospital at the last minute. I would like to thank SS and WF for putting my pole back up when the guys snapped in high winds. QI is putting out an S9 signal around the Province on 7 Mc. RO has new 7-Mc. vertical antenna 115 feet off the ground and a "V" beam directed on Europe for 14 Mc. QC has the key clicks problem on 3.5 Mc. licked. GQ, using a pair of 1128Es and an 832 final, and FU, using an SCR-522, have set up a 5-mile record for 144 Mc. The Above 100 Club has applied for affiliation with the League. Congrats, fellows. AW, in Dauphin, has settled on 14 Mc. and finds the church organ works much better when he stays off 3.8 Mc. KW has new receiver and is active on 14, 7, and 3.5 Mc. FW is back in town and is rebuilding. LC is new QSL Manager. Get your envelopes in. JM has been receiving favorable reports on the sending of official bulletins and this service will continue. Listen on Mon., Wed., and Fri. at 10 P.M. CST. Outside stations have been lined up to clear traffic but the section needs clearing stations in the Province. Interested? Drop me a line.

**SASKATCHEWAN** — SCM, Norman Thompson, VE-5CO — HR worked a CO6 and a KZ5 on 7 Mc. one morning recently, which seems to be a rare feat around these parts. Harold is going in for traffic in a big way and doing FB. GH is back in Ernfold after a stay in Maple Creek. Jerry hopes to be on the air soon. DP is on the air on 7 Mc. running about 4 watts. Les is recovering FB from a broken clavicle. DQ is in Watrous to take up duties as a technician at the transmitter there. There are now seven amateurs in Watrous. Calls are: HH, MP, SD, AG, EA, DQ, and VE1SY, formerly of Sackville, N. B. and now awaiting his new call letters. HH, MP, AG, and EA are active on 28 Mc. 1SY says, "With that QRM on 28 Mc. it's not for me." SD has been heard tuning his rig on 28 Mc. and only needs to put the finishing touches on his converter. BB was high Saskatchewan scorer in the W/VE Contest. Not bad for a first try! OM worked a KY4 and borrowed nails to give his beam something more than moral support. HH, of Watrous, is the author of a poem submitted for publication called "The Saga of a Squirter." Nice going, Harold!

## Strays

An informative 32-page booklet entitled *Special Ceramic Materials and Their Industrial Applications* is available at no cost from the General Ceramics & Steatite Corp., Keasbey, N. J. The publication describes the manufacture, characteristics and applications of ceramic dielectric materials and stoneware related to the electronic and chemical-engineering fields, and is liberally sprinkled with interesting charts and tables.



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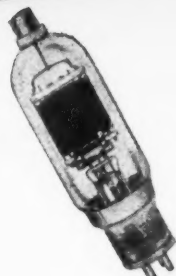
and year to year for the past decade **UNITED** has led in this research and development. **UNITED** has forged a new era of engineering opinion in the industry.

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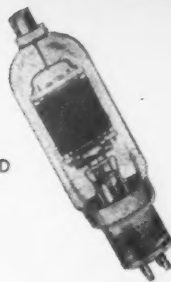
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A mighty Class C amplifier and oscillator-triode. Widely used by amateurs and generally as heavy duty replacement. 300 watts input. 6.3 volt filament.



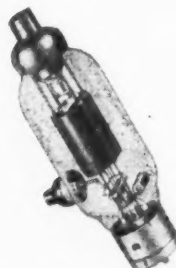
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New VHF tetrode; 175 watts input to 120 mcs. First graphite anode tetrode in this power-frequency range. 6.3 volt filament.



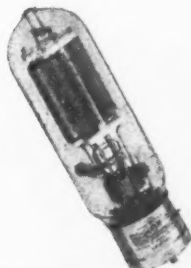
V-70-D

Similar to type 812-H. 7.5 volt filament. 300 watts input. 85 watts plate dissipation.



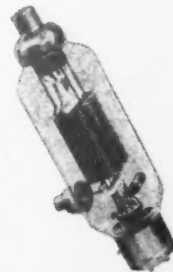
HV-18

Popular Class C amplifier and heavy duty oscillator. Widely used in communications, physiotherapy and electronic heating.



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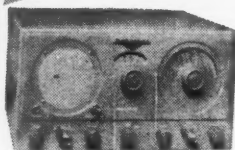
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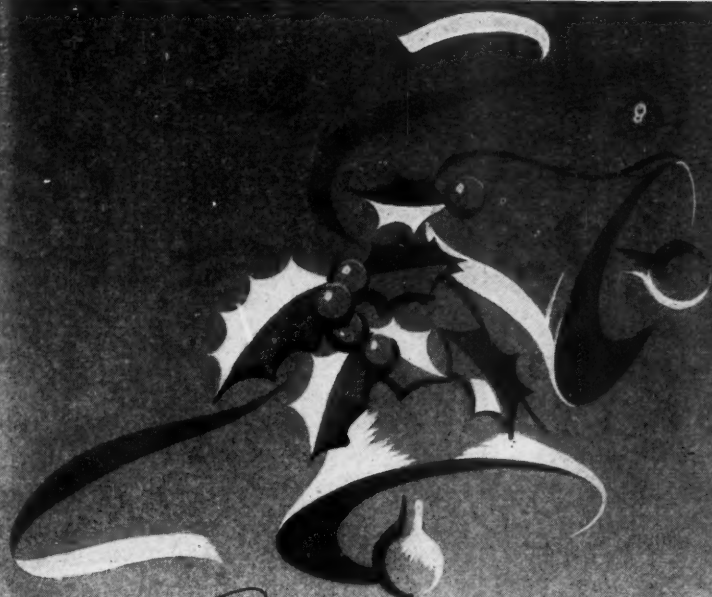
(Continued from page 18)

plished before there can be any peace in the radio world, and that if it is not done the communication services of the world are threatened with substantial extinction in the course of two or three more world conferences. If the tongue of QST can be heard around the world, if in some responsive quarter it can perhaps strike a spark, there may yet be hope for the sadly-pompeoed radio set-up of this globe. What we have to have, it seems to us, is a new invention, a new bit of circuit wizardry, that permits the duplicate use of every frequency by these two modes of operation, with no detectable trace in either of the other. In a perfect solution of this problem it would be possible to tune a communication receiver smack on a local 100-kw. broadcasting station and hear not a smidgen of response, yet when our communication circuit opened up, there it is, loud and clear. Similarly, when a broadcast receiver is tuned to a program, no interference is to be received from a powerful telegraph transmitter next door on the very same frequency. That, and nothing less than that, will satisfy us as a solution to this problem, for what we require is an additional complete spectrum.

We can even take you, we think, the first tiny step toward that solution. We can say that, since h.f. broadcasting and the ship-shore 'phone service and most of amateur radiotelephony are already established on the basis of amplitude modulation, one of the modes to be provided for in our system is plain old A3 telephony. And that therefore what we need is a method of telegraphy that offers no interference to A3 and receives none from it on the same frequency. A distinction in directions or phases or polarities immediately suggests itself to differentiate between the two methods. Considering that A3 is "up-and-down" modulation, one immediately thinks of something "crosswise" for the other mode, and of course some form of f.m. telegraphy or frequency-shift keying is immediately indicated. Indeed, we strongly suspect that when the solution of this problem is found it will involve the new techniques of limiters and discriminators and will be thought of as an application of frequency-modulated transmission. Already it is possible to have f.s.k. receivers that do not respond to A3 emissions, but the second and harder half of the problem remains currently unsolved.

As we see it, this is the problem of the age as far as radio communication is concerned. It is worth anything it costs to answer it, because from the broadcasters' standpoint it offers everything they could wish and for the communication services it is a case of find a solution or eventually perish. We do not believe it is insoluble. Too many marvels of circuitry

(Continued on page 110)



*Wishing you a*  
**Merry Christmas**  
*and a*  
**Prosperous New Year**

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#### ● COMPONENTS

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Same per pair	1.75

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exist for us to think that for a moment. Provided only that the solution is within financial and technical grasp, we believe that the record communication services of the world, including amateur stations, would instantly embrace the new mode, whatever it is, and feel that they were well out of a bad mess. All it has to do is work. It can be done and it must be done. In the final analysis, over the long haul, we think there is no other hope for us communicators.

How now? Do we strike a spark anywhere? What about it, you young fellows? Do you have the beginnings of an idea? The world waits upon it, and it will also wait upon you and lay great fame and vast riches at your feet if you can turn up the answer — because never in the history of communication has anything been so badly needed as radio now needs a second spectrum.

*Adams*

## Sunspots

(Continued from page 17)

The unusual character of this coming winter's high-frequency transmission is also illustrated by Fig. 5, which shows the percentage of the months in the future for various months of the year and also for the entire year that we may expect various levels of monthly median maximum usable frequencies to be exceeded at noon for Washington, D. C. Thus, according to Fig. 5, which is based upon a study of the observations of sunspot activity during the past 10 sunspot cycles, and the assumption of a linear relationship between the m.u.f. and the smoothed Zurich sunspot numbers, we may expect the 50-Mc. band to be useful for half of the time during the month for cross-country ionospheric transmission via the F layer for less than 0.14 per cent of the total number of months and for less than 1 per cent of the future Novembers. In particular, Fig. 5 shows (after adding 15 per cent to the values of m.u.f. given) that the 50-Mc. band may be expected to be usable for a very small percentage of the time only during the winter months from October through February.

It will be noted that emphasis has been given to the problem of transmission across the United States via the F layer in the 50-Mc. band. It may surprise some amateurs to learn that this is apparently a more difficult 50-Mc. transmission path than some of the transmission paths to foreign countries. For example, although no East Coast to West Coast  $F_2$ -reflection contacts were reported as being made last November in this band except for the QSO between W4GJO, Orlando, Florida, and W6QG, Santa Ana, California, W1HDQ was heard by G5BY and G6DH

(Continued on page 118)



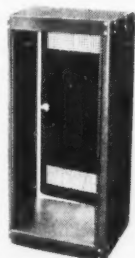


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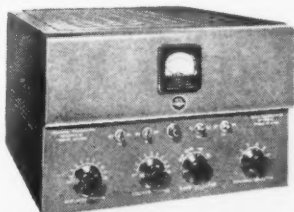
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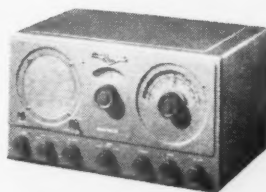
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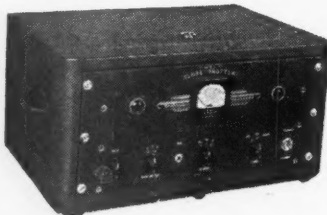
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Brand New—120 watts input. Tunes 7 to 9.1 mc. 12J5 osc. Two 1825's (12 volt 807's) in final. Complete with tubes and crystal, each .....\$5.95

**VFO AND XMTR** — Brand new CBY-52232. Navy version of 274-N. Tunes 2.0 to 3.0 mc. Similar to 459-A. Will tune 4.0 mc with little change. Complete with tubes and crystals, each ....\$5.95

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**VFO AND XMTR—BC-457-A** Xmtr. Tunes 4 to 5.3 mc. Nearly new, in good condition. Similar to 459-A. Complete with tubes and crystal. A steal at ....\$3.95

**BC-654—Xmtr-Receiver.** Used. 25 watts output. 3800 to 5800 kc. 13 tubes. Phone and cw. Fine for 80. Reg. \$351 value .....\$12.95  
**BC-654—BRAND NEW Xmtr-Receiver—with spares.** In original crate. Export Packed.....\$22.50  
**PE-104—Receiver Power Pack for above.....\$9.95**  
**New PE-103 Dynamotors.....\$9.95**  
**New 304TH Tube .....\$4.95 each**

Have you entered  
Leo's big contest?  
See QST november  
issue.  
744 West Broadway — Council  
Bluffs, Iowa



in England on November 24, 1946.\* Other promising international transmission paths for the coming winter months can be found by examining the CRPL predictions for these months.

Undoubtedly this coming winter season will afford numerous opportunities for amateurs to make new and interesting long-range contacts using very low-powered transmitters on the 50-Mc. band.

\* E. P. Tilton, "The World Above 50 Mc." p. 50, Jan. 1947 QST.

### Start Right on 1 1/4

(Continued from page 25)

transmitter and superhet receiver were ready, a Sunday-night schedule was arranged. This met with success on the first try, and contact has been made without fail weekly for more than two months since. The solid nature of communication over this circuit has been a surprise to all who have seen it in operation.

Though the writer has not yet attained his avowed objective of working a W2\* to break the present 186-mile record for 1 1/4-meter work, it was nearly accomplished on several recent occasions, when W2HWX has been received with good strength. He is running 200 watts, crystal-controlled, and apparently the 26 watts at this end was not quite enough to make it two-way. Close, but no cigar! It is safe to predict that, given a winter season to develop improved gear and a campaign to get more stations active by next spring, 200 miles and greater distances will be successfully covered many times on 235 Mc. in 1948.

\* As reported elsewhere, the first 235-Mc. W1CTW-W2HWX contact was made on October 5th, a distance of more than 200 miles, establishing a new record for two-way work on this band. — Ed.

### Code-Practice Receiver

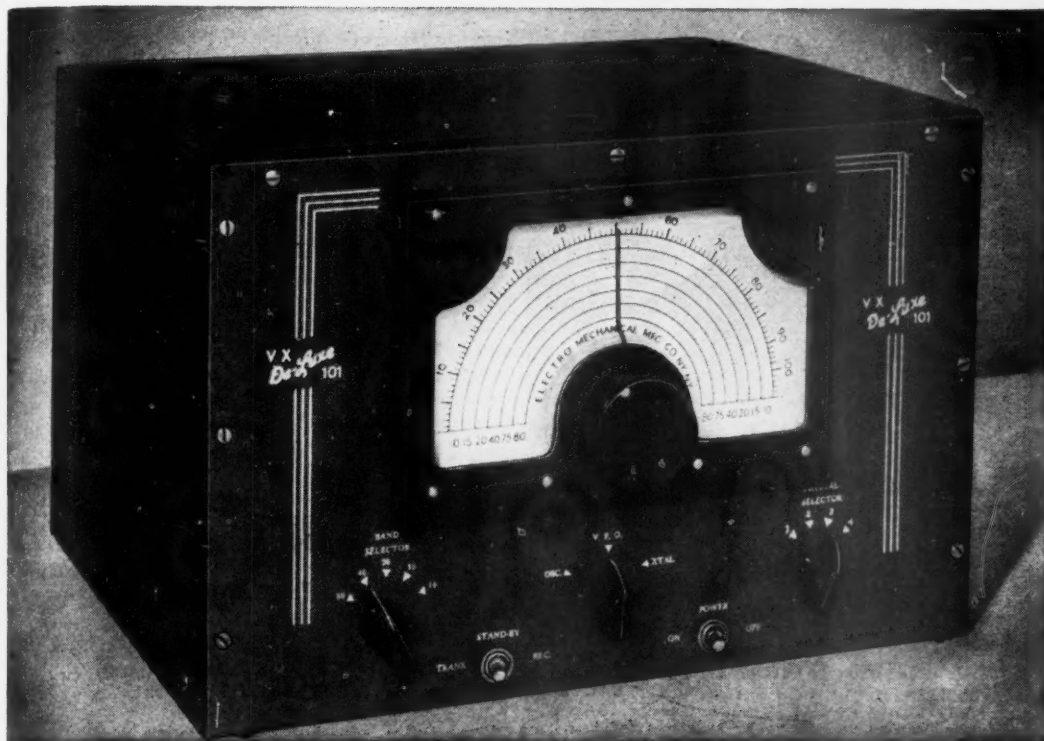
(Continued from page 34)

dashes, while voice signals will sound as steady whistles with the voice distorted so that it cannot be understood. To listen to a voice signal, turn the regeneration control to the point at which oscillation just barely stops. In this position, the voice should be heard clearly. Slight readjustment of the bandsread tuning dial may be required to bring the voice signal to peak amplitude, but by careful adjustment of the regeneration control and the tuning dial, all but very weak voice signals will become intelligible.

The amateur bands may be found on the dial by setting the bandsread dial with its plates at maximum capacitance (fully meshed), and tuning with the band-set dial. Amateur signals may be identified as such with ease when they are 'phone (voice) stations, but c.w. (code) stations are identifiable only by a knowledge of the code. In general, it will be found that the amateur bands may be located by the fact that there is a great number of stations operating close together, much

(Continued on page 114)

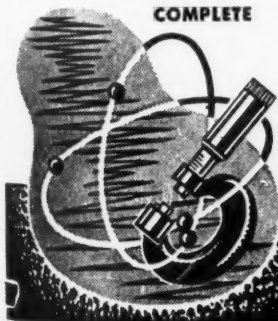
# VX-101 DE-LUXE VFO-XTAL



## EXCITER-TRANSMITTER

**15 TO 20 WATTS** OUTPUT  
ON 80, 40, 20, 15, AND 10 METERS  
EVERY UNIT INDIVIDUALLY CALIBRATED

AMATEUR NET  
**\$118.50**  
COMPLETE



HUNDREDS ALREADY IN USE . . . The VX-101 DE-LUXE is the ideal front end for that new transmitter you've been dreaming of. There's enough output to drive almost any high powered amplifier you may contemplate building. The frequency stability and keying characteristics of the V.F.O. are unsurpassed. A separate crystal oscillator with provisions for switching 4 crystals, giving 20 spot crystal frequencies thru-out the operating range of the unit for net operation or band-edge spotting.

Provisions are made for either oscillator or amplifier keying. Individual calibration for maximum accuracy. Ganged oscillator and amplifier makes band-switching a single operation. Don't forget THE VX-101 DE-LUXE IS A DANDY LOW-POWERED XMTR BY ITSELF. Attach an antenna and you're on the air. IMMEDIATE DELIVERY — SEE YOUR DEALER. WRITE FOR BULLETIN D FOR FURTHER DETAILS.

**ELECTRO-MECHANICAL MFG. CO.**  
20-29 STEINWAY STREET, L. I. C. 5, N. Y.



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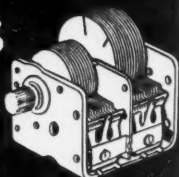
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5" long, 1/4" nut, sturdy, black  
"Feneline" wrench, hexed all the way.  
When one part goes, just saw off and  
continue using. Yours free with any  
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OSC. cut sec.—162 mmfd.

Variable condensers, with trimmers.  
Available with or without drum. Ideal  
where space is limited. 2 1/4" x  
1 3/4" x 1 1/4". Non-corrosive aluminum  
plates are firmly staked. 3-hole bot-  
tom mounting. Clock-wise or counter-  
clock-wise. Please specify.



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**99c** each

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Specially developed for H.F.  
work. Low shunt capacity.  
Rated for average anode cur-  
rent of 22.5 ma.

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MITTER.** 75-watt output on the 10-11, 6- and  
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**NATIONAL NC-57 RECEIVER.** Continuous cov-  
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in speaker. 7 tubes superhet plus voltage regu-  
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- ✓ Mast in four sec-  
tions
- ✓ Can also be used  
for mounting your  
own array
- ✓ Can be easily  
mounted by one  
man
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wires and hard-  
ware
- ✓ Completely  
weatherproofed

Here's what you get:

- 4 eight-foot mast sec-  
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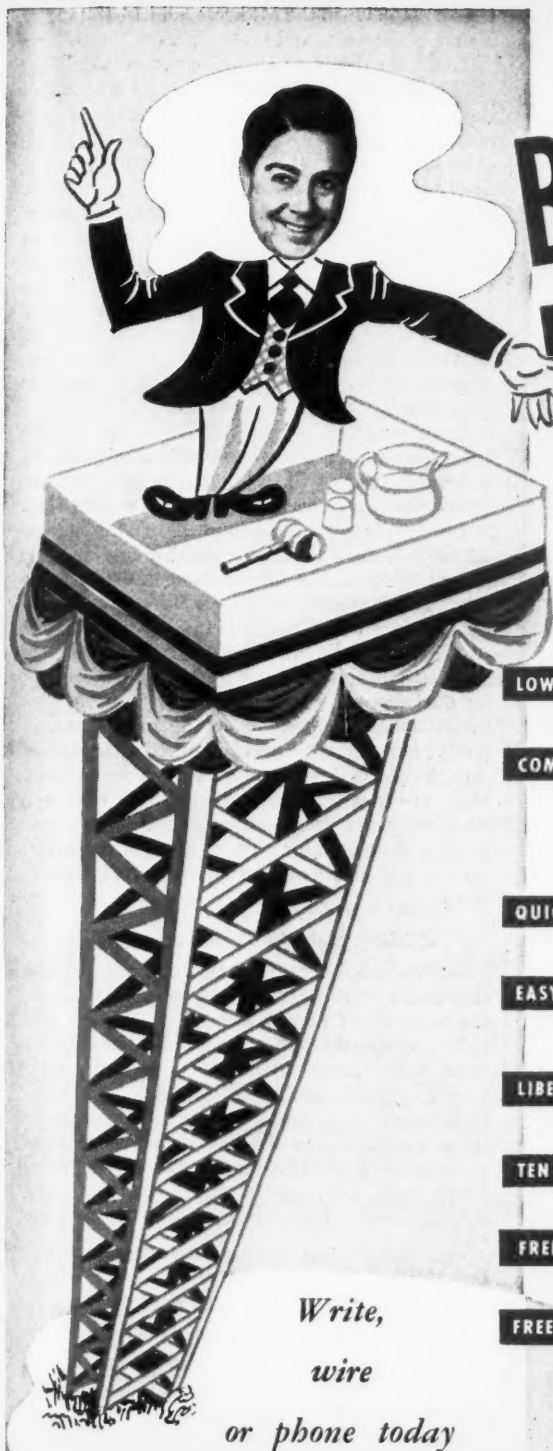
closer than stations in other parts of the spectrum. If the entire band is to be covered by the band-spread dial, the low-frequency end of the band must be set so that it is tuned in with the plates of the bandspread dial almost fully meshed. As the dial is turned to open the plates, the receiver will tune higher in frequency, and the high-frequency end of the band will be reached with the condenser plates almost all the way out. A little practice is all that is needed to get the "feel" of the receiver so that a knowledge of the dial settings required to tune the amateur bands can be obtained. Once they are learned, jot down the settings of both dials for future reference. If difficulty is experienced in locating the amateur bands, ask any near-by ham to put his trans-mitter in operation, ask him his frequency, and tune for him in the range in which he is trans-mitting. Better still, if you are on friendly terms with the local radio repairman, he may be willing to let you use his signal generator to obtain a calibration of dial setting vs. frequency. A simple calibration chart can be made up for future reference.

Commercial stations sending c.w. will be found at numerous points on the dial. Some of these send code groups that will mean nothing to any-one who does not know the particular code used, but others send text in plain language. Some will be found that are sending at speeds around 15 words per minute. These are useful to anyone who is learning the code, after some ability to receive has been gained. It has been found by experience that improvement in code speed comes more rapidly when the learner is trying to copy speeds that are a little faster than he likes. In this way there is an unconscious effort to progress that speeds the process. There is not space in this article to go into a more thorough discussion of the actual process of learning the code, but a list of ARRL publications and training aids that are available appears at the end of the article, along with references to several articles that have ap-peared in *QST* in past years. While these issues of *QST* are no longer available, many public li-braries have them on file.

Perhaps the best source of on-the-air code prac-tice is the Headquarters station of ARRL, W1AW, located in Newington, Conn. Transmis-sions especially prepared to assist learners are transmitted from this station on regular schedule. The schedule is listed under "Operating News" in *QST* each month, and contains a list of the texts that are used. In most cases the texts are taken from articles that have appeared in recent issues of *QST*, thus providing the learner with a method of checking his progress. W1AW trans-mits at speeds ranging from 9 words per minute upward, so that learners in all stages of advance-ment can benefit. Transmissions are made simul-taneously on one frequency in each major ama-teur band, so that amateurs living at a distance will listen on one band, while those in the East will use another. In general, nighttime reception of W1AW is best on 3555 kc. in the northeastern

(Continued on page 118)





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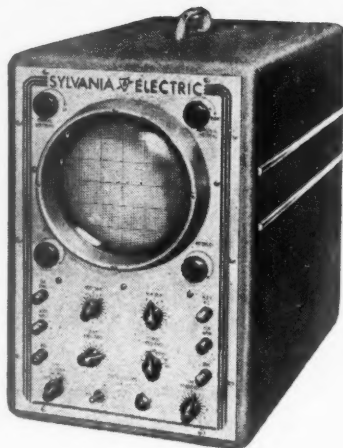
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This Sylvania-engineered instrument is ideal for audio circuit analysis, transmitter checking, filter circuit and hum analysis. Addition of a Z axis input for intensity modulation permits study of pulses and portions of cycles, opening the way to many industrial applications.

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U.S.A., 7145 kc. in the Midwest, and 14,150 in the South, Southwest, and on the Pacific Coast.

To use the receiver as a code-practice oscillator, plug a telegraph key into  $J_1$  on the rear edge of the chassis and set the toggle switch to the "send" position. When the key is closed, the audio circuits will oscillate at a frequency (tone) that is determined by the setting of the volume control. The circuit is arranged to reduce the plate voltage on the audio tubes when the receiver is used as an audio oscillator. This is necessary to reduce the volume to a comfortable level. If the audio tone sounds rough, it is because the detector is still oscillating. Turn the regeneration control to another setting, and the tone should become clear. Instructions for proper sending will be found in the references at the end of this article.

A word should be said about the use of long antennas with this receiver. While the rod antenna described above will give good results in most cases, louder signals will be heard if a wire 25 or 30 feet long is used. The compression trimmer condenser,  $C_1$ , must be readjusted if a long antenna is used. It should be set at that point which permits smooth regeneration over the portion of the range that is being tuned. It may be necessary to readjust the trimmer when changing from one band to another. This will have to be determined by trial, depending almost entirely on the particular antenna used. When the rod antenna is used, the trimmer should be turned to maximum capacitance (adjusting screw turned down tight). Best results will be obtained in either case only when the receiver chassis is connected to a good ground. A cold-water pipe, or a metal rod driven several feet into moist earth, will usually be adequate.

## **Bibliography: Learning the Code**

Several ARRL publications contain information that is of value to beginners who are learning the code. Chief among these is a 40-page pamphlet *Learning the Radiotelegraph Code*, available at most radio stores. In addition, several articles have been published in past issues of *QST*. While these issues are now out of print, they are sometimes available in local public libraries. Of principal interest in this classification are the following:

- "This Business of Code" (Huntoon), *QST*, Feb., 1941.
- "The Secrets of Good Sending," Part I (Battey), *QST*, Sept., 1941.
- "The Secrets of Good Sending," Part II (Battey), *QST*, Oct., 1941.

Several training aids are available through the Communications Department of ARRL. These may be requested by clubs and groups.

- "A Code Instruction Program for the New Man"
- "Lessons in Receiving" (9 lessons)
- "Lessons in Sending" (8 lessons)

Code-instruction records (phonograph)

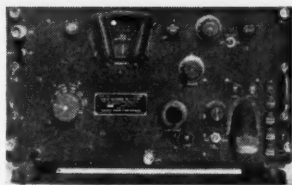
TA1: 9 records, 18 sides, for the beginner.

TA2: 8 records, 16 sides, for the advanced student, with tests at speeds up to 10 w.p.m.

Tape recorders and keyers, with prepared tape, are also available, on a loan basis, to affiliated clubs, as a part of the Training Aids Program. A

(Continued on page 118)

# If it's Radio... HARVEY has it!



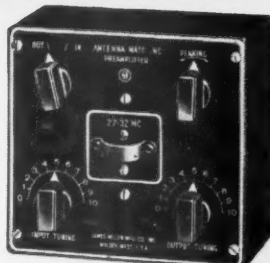
**BC 314 RECEIVER**

Used but in perfect condition. Two stages RF, separate local and beat oscillators. For 12-volt DC operation but easily converted to 110-volt AC. Frequency range 150-1500 KC, continuous in 6 bands. This unit is ideal as an airport or marine low frequency receiver, also a very excellent BC receiver. Complete with tubes, specially priced at.....**\$29.50**

## MILLEN R-NINER

Millen 92101 is an antenna Matching Preamplifier combining an electronic impedance matching device and a Broad-band preamplifier. Designed primarily for use on 6 and 10, coils are also available for 20. Uses 6AK5, has power plug for connection to receiver. With 10 meter coils, less tube.....**\$24.75**  
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Coils in stock for 6 or 20 meters, each.....**\$3.15**

NEW—Coils designed by Millen for the R-Niner to be used on television channels 2, 4 and 5.



46992, for TV Channel 2.....**\$3.90**  
46994, for TV Channel 4.....**3.90**  
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Harvey has 20 meter crystals for a buck! Mounted in holder with 1/2" pin spacing. Also 40 and 80 meter and 6 and 13 mc. bands at the same low price.....**\$1.00**  
Special 8 mc. xtals for 2 meter xtal control, only.....**\$1.50**

Also in stock complete line of Bliley AX-2 xtals  
Include 10¢ postage with your crystal order

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Army phones, surplus, 24,000 ohms impedance. Adjustable steel headband, featherweight. Brand New. Complete with plug.....**\$2.95**

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Western Electric 3" meter, 0-20 mils DC.....**\$1.95**

Western Electric 3" meter, 0-200 microamps DC.....**\$3.95**

Westinghouse 3" square meter, rectifier type, 0-150 V.AC.....**\$3.95**

General Electric 3" square meter, 0-150 mils DC.....**\$2.95**

Abbott TR-4B transmitter-receiver, 144-148 MC. Brand new original factory sealed cartons, less tubes...**\$31.50**

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300-ohm cable.....per foot **3¢**

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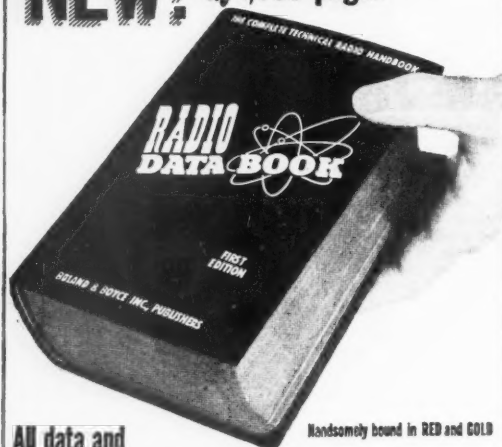
Cornell-Dubilier TJ-20040 oil-filled capacitor. Rated 4 mfd at 2000 V DC working.....**\$3.75**

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full listing of such aids may be obtained from the Communications Department of ARRL. Available to anyone interested is a list of amateur stations sending code-practice transmissions and of commercial stations sending press copy. The list is revised periodically to include the frequencies and schedules of active stations.

## Winds and Waves

(Continued from page 44)

The following is a partial list of stations and operators who are known to have played a part in the humanitarian task just chronicled in detail: W1AW (operator Bill Matchett), W2s CGG, KFA, ORF. W3s BHK, GA, HN. W4s AKI, BAQ, BRB, BXL, CNT, CQZ, DXD, EAW, EKA, FDF, GCL, GGL, GIL, GOG, HCM, HDX, IAW, IRA, JAM, JDR, JIS, JLN, JVL, KAD, KNI, LJM, LJS, MNV, NR, OI, SCR. W5s ASO, AST, ATW, AZS, BAF, BUK, BYX, CVA, CVW, DEW, DJA, DNM, DNS, FYZ, GKK, GRE, GRG, GRJ, GWZ, HIV, HLH, HOU, HRW, HVW, ISF, IZL, JAC/4, JFO, JOY, JZ, KOU.

Also W5s LSN, MMZ, MUR, MXJ, MXM, NIY, NJB, RN, RY, USN.

W6s FGU, MI, VJQ, YXI; W9s UGH, BDK; W0s GZR, ROB, SAI; KV4AA.

## I.A.R.U. News

(Continued from page 45)

radio equipments and literature. Efforts are being made to have official licensing resumed and amateur activities restored to normal.

## WAC CERTIFICATES

The International Amateur Radio Union welcomes applications for the coveted Worked All Continents award. The certificate is available to licensed amateurs who submit confirmations of two-way communication with an amateur station in each of the six continental areas of the world: North America, South America, Africa, Europe (including European Russia), Asia (including Asiatic Russia), and Oceania (Australia, New Zealand, the Philippine Islands, the Netherlands East Indies, and most of the Pacific islands).

Under the rules of the Union governing the issuance of WAC certificates, the applicant must be a member of the I.A.R.U.-affiliated amateur society of the country in which he normally resides. No fee is required from such applicants. Persons residing in a country not represented in I.A.R.U. must pay a fee of 50 cents to the Headquarters before a certificate can be issued.

Applications should be sent to the headquarters of the national amateur society; if there is none, they may be sent to Union headquarters, care of A.R.R.L. Two types of certificates are available: the regular award, and a special one for telephony. In addition, there is a 28-Mc. endorsement available if an applicant submits cards showing that all contacts took place on that band.



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413	430	446	470	491	506
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415	433	448	473	493	508
416	434	451	474	494	509
418	435	453	475	495	511
419	436		477	496	512
420	437	457	479	497	515
422	438	458	481	498	516
423	440	459	483	501	518
424	441	462	484	502	519
425	442	463	485	503	522
426	443	466	487	504	523
427	444	468	488		

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## For Crystal Controlled Signal Generators 525kc

526.388	531.944	537.500
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## Assorted Miscellaneous Crystals

Fractions Omitted			
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372	377	383	388
374	379	384	
375	380	386	

39¢ priced at a fraction of the cost of their holders alone.

\* Payment with order. Enclosed 20¢ for postage and handling. Minimum order — \$2.00 plus postage. Please specify alternate choices or "no substitutes."

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391	395	400	404	408
392	396	401	405	409
393	397	402	406	411

**79¢ EACH**

## Crystal Frequency Standards 98.356kc

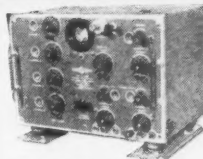
Easily altered for 100 kc Standard. Mounted in low loss 3 prong holder.

**\$4.49**

## I.F. Frequency Standards

450kc	455.556kc
451.388kc	459.259kc
452.777kc	461.111kc
454.166kc	464.815kc
	465.277kc

**99¢ EACH**



**100 WATT  
BENDIX  
TRANSMITTER  
TA12**

**CHECK THESE VALUES:** Three 807 Tubes, four 12SK7, one 2 inch 5 amp. RF meter, FOUR SEPARATE MASTER OSCILLATORS. (These can be easily changed to cover 20-40-80 meters and by using crystal for the 10-meter band you will have a complete coverage transmitter.)

Four separate output tanks.  
One 4 position selector channel switch having seven sections which changes the ECO, IPA and output tanks simultaneously. All the controls are mounted on the front panel. The housing is cast aluminum; shields and case are sheet aluminum. Dimensions 11 x 12 x 15 inches, weight 35 1/2 lbs. Complete, simple instructions for conversion **\$49.95** furnished. Complete with tubes. . . . .



**110 VOLT AC  
SUPERHETERODYNE RECEIVER:**

This crystal fixed frequency receiver comes with full conversion instruction for variable tuning of all ham bands and broadcast. A highly selective superheterodyne receiver, 110 V.A.C. power supply built in. Uses the following tubes: 6K7 RF Amplifier; 6K8 Mixer and Oscillator; 6K7 I.F. Amplifier; 6F7 Detector and A.V.C.; 6C8 Output and Noise Suppressor; 80 Rectifier. Dimensions — 3 1/2 x 19 x 11 1/2 inches. Comes complete, brand new, with one set of coils and two sets of tubes. **\$16.95** Extra set of coils. . . . . **\$2.95**

## BC-221 FREQUENCY METER

A heterodyne frequency meter complete with tubes, crystal, calibration chart and guaranteed accuracy of .01% or 500 cycles, whichever is greater. Better than two dial division per kc. Fundamental ranges are 125-250 and 200-400 kc. Can be used with 110 volts AC power pack, batteries or vibrapack. Makes a fine signal generator or converts to VFO. These are slightly used but **\$37.50** Guaranteed A-1. . . . . **\$54.50** With Modulation . . . . .

## WAVEMETER

We're closing out the last few of these precision wavemeters which tune from 150-210 mc and which contain a high quality resonant cavity wave-meter, oscillator, heterodyne amplifier, electric tuning eye, complete with 19 tubes, 110 v AC power supply. The tubes alone far exceed your **\$24.95** close-out costs of only

## SPERRY AMPLIFIER

Brand new servo amplifier containing two beam power output tubes (1632) similar to 25L6, two twin triodes (1633 and 1634) similar to 6ST7, two mica condensers, dozens of color coded half watt resistors, two dual and four section bathtub condensers, three transformers, two wafer switches, one volume control, four octal sockets. Easily convertible. **\$3.95**



**D.C.  
MILLIAMMETER**

Brand new General Electric 2 1/2" round panel meter. . . . . **\$2.97**



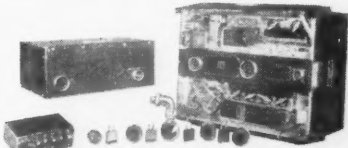
**A.C.  
VOLTMETER**

Brand new G.E. or Westinghouse 3" square panel meter. 0-150 V. Ideal for checking primary volt. . . . . **\$3.49**



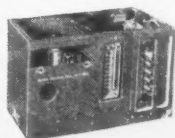
**TS13 HANDSET**

Combining a 200 ohm carbon mike and 2500 ohm earphone with butterfly switch for talk-listen. Has 6' flexible rubber cord with 1-PI55 and PL68 plugs attached. . . . . **\$2.95** new. . . . .



**SCR-522 VHF XMTR-RCVR**

The finest all purpose equipment on the surplus market. Don't confuse these with other incomplete and abused 522s. . . . . **AND COMPLETE with 10 tube superhet receiver with squelch circuit, 7 tube xmtr, remote control box, 28 volt dynamotor (can be converted to 110 V. operation), 4 crystals and all cable connectors but less cables** . . . . . **\$24.95**



**BC 684 F. M. 35 Watt Transmitter.** Brand new, complete with eight tubes, crystal control, 10 channel pushbutton, non-linear modulation coil — less coverplate, crystal and power supply. . . . . **\$24.95**

**SUN RADIO**  
OF WASHINGTON, D. C.  
938 F STREET, N. W. WASH. 4. D. C.



# Be Santa Claus to Your Friends

Each year an increasing number of individuals find *QST* to be the ideal gift. A subscription present is unique, too. It serves as a monthly reminder of your thoughtfulness. A yearly subscription, including League membership, is but \$3.00 in U. S. A. and Possessions, \$3.50 in Canada and \$4.00 elsewhere, little enough for the ones you have in mind. And . . . we'll send an appropriate gift-card conveying your Christmas Greetings at the proper time.

*A Monthly Reminder  
OF  
Your Thoughtfulness  
AND  
Good Judgment*

## **QST**

38 LA SALLE ROAD  
WEST HARTFORD, CONN.  
U. S. A.

## Transmission Bridge

(Continued from page 55)

with p.a. plate power reduced or removed, or a low-power stage of the transmitter at the operating frequency. More power will overheat resistor  $R_1$ , and the additional power is not required anyway. Assuming you want to terminate properly a 50-ohm line, set the variable condenser to the previously-calibrated 50-ohm position. Unless the line is perfectly terminated, the bridge will not be balanced. The bridge will give only a dip, not a real zero, at 50 ohms if any energy is reflected back from the termination. Only when the line has 50 ohms of resistance, and no reactance, will the meter read zero. Adjust the termination until the bridge meter reads as low as possible. (It is not usual to get a perfect match when a line is terminated by an antenna, and you can expect that there will always be some reflection, or standing waves, on the line.) The example given above is for a 50-ohm line. For a 300-ohm line, for example, set the condenser pointer to 300 and proceed as before. It is sometimes helpful, when the line adjustment is far off, to turn the condenser through its range to see what resistance the line does look like. You can use this as a guide to see whether or not the changes you make in the termination are in the right direction.

### Standing-Wave Ratio

To measure s.w.r., reverse the connections to the bridge so that you are feeding the r.f. into the bridge output circuit. Connect the line to the input circuit of the bridge. Adjust either the sensitivity of the meter, or the power into the bridge, or both, until there is a full-scale reading. Now reverse the bridge again, with the same amount of power fed to the input. Assuming full-scale reading to be 1, the standing-wave ratio is approximately:

$$s.w.r. = \frac{1 + REF}{1 - REF}$$

where *REF* is the reflected-current reading. If the reflected-current reading is 0.4, the standing-wave ratio is 1.4/0.6, or 2.3. A curve can be drawn for a wide range of values of s.w.r. vs. reflected-current reading, but the calculations can be made mentally without much effort. If you prefer, the meter dial can be calibrated directly in s.w.r.

The statement above is not strictly true under all conditions. As a figure of merit, the answer obtained is satisfactory.

The current in the meter is caused by the voltage drop across the inductance and the voltage drop across the condenser,  $C_1$ . Now the voltage drop across the inductance is proportional to the current in the line. The voltage drop across the condenser is proportional to the voltage across the line. The sensation experienced by the meter is that of the sum of the two currents. The reading is not circuit voltage, current, or power, but a

(Continued on page 122)

# HARRISON HAS IT!

# HARRISON HAS IT!

# R

## for a Merry Christmas

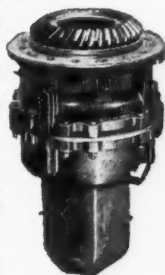
1. Circle the items that would make you happy.
2. Leave the book, open at this page, where it can be seen by the YF, Dad, or whoever is your personal Santa Claus.
3. MERRY CHRISTMAS!

73, *Bil Harrison*, W2AVA

P.S. Of course, if you are your own Saint Nick, just send me your order and enjoy the pleasure and benefits of my friendly, helpful service. Top quality equipment—all makes and models, at lowest prices and with quickest delivery. Higher trade-in allowances and easy pay terms. I GUARANTEE you complete satisfaction!

## Here's the ROTATOR for your BEAM!

- ★ Runs on 24 to 33 volts AC or DC (4 amp. transformer will do)
- ★ Reversible—only three wires required.
- ★ 7000 to 1 Gear Reduction stops free swing.
- ★ Approx. 1/4 RPM.
- ★ Powerful 1/4 HP motor, rugged precision gear train, and sturdy thrust bearing—will support and turn even a heavy dual beam.



Used on aircraft to control pitch of propeller blades, these dependable power units are excellent beam rotators. Used, but in perfect tested working condition, with instruction sheet. **\$12.95**

(Mail orders add \$1.25 for packing)

**New! EIMAC 4-65A**

Compact, efficient, smaller version of the 4-125A. 65 watts rated plate, up to 265 watts output. **\$14.50**

**Harrison has STEEL!**

Chassis, Panels, Cabinets, etc. etc. Send in your order—we'll fill it immediately at our usual rock-bottom prices!

## Scoop on COAXIAL CABLE RG-8/U — 2 1/2' FT.

The good kind! Clean, new, perfect. 52 Ohm impedance. Handles 2 KW at 30 Mc. Full 1,000 foot reel for only **\$25.00!** Cut to length: 6¢ per foot; 100 feet or more at 4 1/2¢.

RG-11-U. 75 ohm. 7¢ ft. 100 ft. or more at 5¢.

**Immediate Shipment**

**HSS kit of parts for**

**Collins new 75A-1**

**5,000 VOLT SUPPLY**

Ham Band Receiver.

for scope, TV, etc. Transformers, tubes, sockets, condensers, circuit breaker switch, etc., with diagram

Complete, FOB

Cedar Rapids **\$375**

**\$12.45**

**Harrison has TELEVISION PARTS!**

## Harrison has Transmitters!

Come in and see them all on display—or write me for literature.

TEMCO new RA series: 250 Watt CW. **\$334.50**  
150 Watt Phone/CW with VFO, exciter switching, etc. **\$603.75**  
Other Combinations and build-up units available.

HALLICRAFTERS: HT-17 **\$69.50**. HT-9 **\$350**  
SUPREME AF-100. 100 watt AM-FM-CW. Complete with all coils and tubes. **\$550**

COLLINS 30K. **\$1,450**, Complete.

MECK T-60. **\$150** SILVER 701. **\$36.95**

HAMMARLUND Four-20. **\$120**

Enjoy now, and pay over 12 months with the

**Harrison EASY PAY PLAN!**

## SOLDERING GUN

No more waiting for iron to heat up, or constantly retinning too hot iron! Pull the trigger of the new Weller "Speed-lite" and solder in FIVE SECONDS. Built-in spotlight illuminates work. Slender tip can be bent to get into tightest corners. 110 volt AC. **\$12.95**

## Bargain Combination Offer for TWO METERS

Abbott TR-4B Transmitter-Receiver, Abbott BM-2 five element pre-tuned beam, and 6 volt DC Vibrator pack for mobile or 115 volt AC pack for shack use. All brand new, latest production equipment. Regular total value over \$80.00! A Harrison SPECIAL... **\$49.85**

## Harrison Select Surplus Bargains

TUBES: 3C24 (24G).....SIX for **\$4.18**  
3E29 (829-B).....TWO for **\$3.97**  
2X2 (879).....TWO for **\$1.58**  
6AG5.....THREE for **\$1.98**

All other JAN Surplus tubes at lowest prices

Navy Crystal Calibrator — Oscillator-Monitor CGQ 61033. Complete with instructions, spare parts, tube. **\$3.84**

Crystal Phono Pickup, complete. **\$1.79**

## OIL CONDENSERS:

2 Mfd 1000 Volt. Round upright can. SIX for **\$1.98**

2 Mfd 600 Volt. Bathtub. SIX for **\$1.48**

BC-406 UHF Receivers. 115 volt 60 cycle operated. Like new. Complete with 15 tubes and instructions for conversion. **\$14.98**

RELAYS: Sensitive, 10,000 ohm. Positive action on less than 1 MA. **\$1.19**

Overload. Pulls out on 15 MA or more. Has 115 volt AC reset coil. **\$1.65**

BEEDE O-1 DC MA meters. 3 1/2" flush. **\$3.89**

**HAM HEADQUARTERS**  
Since 1925!



# HARRISON RADIO CORPORATION

12 WEST BROADWAY • NEW YORK CITY 7

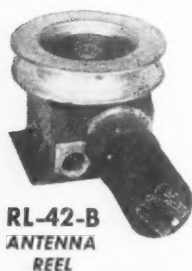
PHONE—Barclay 7-9854 • EXPORT DEPT.—CABLE—"HARRISORAD"

[JAMAICA BRANCH—172-31 Hillside Ave.—REpublic 9-4102]



# FLASH!

**NOW AVAILABLE FOR FIRST TIME  
AT LOW COST!**



**RL-42-B  
ANTENNA  
REEL**

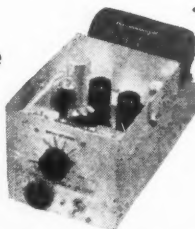
General Industries Motor 24V. D.C. Complete with Reel. Reversible Motor, can be used on 24V A.C. for Rotary Beam Mechanism, 35 r.p.m., etc. 10-lbs. shipping weight.

YOUR  
COST  
ONLY

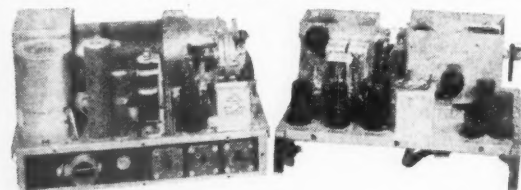
**\$1.95**

## AM-26/AIC Interphone AMPLIFIER

Contains: 2-12A6, 2-12J5GT Tubes Westinghouse Dyna-Motor 28V, input, 250V, at 60 MA. Output. Complete in case. Good for parts or amplifier. Case can be used for Converters, Small Mobile Transmitters, etc. 11-lbs. shipping weight. Amateur Net.....



**\$1.50**



## BC-966-A IFF UNIT.....ONLY \$3.95

Contains following: 3-7193, 7-6SH7, 3-6H6 Tubes Pioneer Gen-E-Motor—18V. input, 450V—60 MA. Output. Four Low-Current Relays. The 7193 Tube is a High Frequency 6J5. Good for parts, etc. 35-lbs. shipping weight.

PRICES SUBJECT TO PRIOR SALE

All prices F.O.B. Los Angeles (California purchasers add 2½% sales tax). Include 25% with order—balance on delivery. Foreign orders cash.

Get YOUR NAME on our mailing list. We'll keep you posted on merchandise available, new equipment and special bargains. Address correspondence to Dept C-2.

## RADIO PRODUCTS SALES INC.

1501 South Hill Street • Los Angeles 15, Calif  
Phone: FR. 7471 • Cable Address: RAPRODCO

summation of the effect of line voltage and line current.

The utility of the bridge is not limited to adjusting the terminations of transmission lines. Other uses are: impedance measurements and adjustments of tuned circuits and networks, checking transmission efficiencies of networks and transmission lines, investigating transmission-line terminations at receiver input circuits, and many other uses that have been mentioned in other articles covering similar measuring devices.

## Paradise Regained

(Continued from page 58)

here. As it raises and lowers, the poles move to bring the angles back to optimum. It's all automatic. Works perfectly, too."

Elmer hesitated, trying to hide the twitching fingers. "Any chance for a stranger to sit in?"

"Gosh, yes, Elmer, sit right down. But forget that stranger stuff — you're one of us now. This is the send-receive switch, and this one controls the antenna direction. You know this receiver, don't you?"



Elmer nodded. The receiver was a Super-Snooper 73, and he knew it because he had read the specs from cover to cover a thousand times. It had always been too high-priced for him or anyone he knew, but it was a prize he had always dreamed about owning some day. The first thing he noticed as he tuned across the band was how the signals stood out above the quiet hiss of the background noise, and how easy it was to separate signals.

Joe moved over to an easy chair and picked up a 1919 copy of *QST*. His thoughts wandered back as he gazed at the ads for rotary gaps and Grebe tuners.

Elmer was busy getting the feel of the band. It didn't take long — he spotted a J2 handling traffic with a W6, a ZS chewing the fat with W1FH, a VS2 asking G2MI about BERTA, and W6QD calling a WØ. One thing worried him a little.

"Your rhombic doesn't seem to be too directional, Joe. I can hear quite a bit of stuff without rotating it."

"Sorry, Elmer. Guess I forgot to tell you," said Joe, looking up from a Murdock ad. "On

(Continued on page 124)



"D  
To m  
order  
contin  
fo

ARRL  
TORS



1



4

## SURPLU

- No. 1 • Filter Shp.
- No. 2 • Plate M.
- No. 3 • Dual 150
- No. 4 • Filter Shp.
- No. 5 • RCA to Sec Shp.
- No. 6 • Filter Shp.

REMEMBER  
Ash store, Se  
that trade!

## Other

- Selsyn Moto
- Large con
- Shpg. Wt.
- Shpg. Wt.
- By Pas
- .002 x 300
- 1/2 lb. ....
- Filter Conde
- VAC, good
- Shpg. Wt.
- Plate Transl
- 150 MA. 1
- Wt. 18 lbs
- Filament Tr
- at 25 Am
- Shpg. Wt.
- Filter Choic
- ohms. Shp

W6JWD • W6



# GIVE YOURSELF THE FINEST XMAS PRESENT EVER

**TIME  
PAYMENTS  
AVAILABLE**

What better time to give yourself the rig you've always wanted... especially when Walter Ashe's big "Surprise" Trade-In Allowance on your used equipment means really important money-saving. Fortunate is the Ham who is on the "receiving end" of one of these new Receivers. So make your selection. Tell us what you have to trade. We'll follow with an offer that's sure to please you.



## ARMY SURPLUS HEADPHONES

Type HS-16A. Army Surplus phones. Canvas Web Headband and long standard type cord. Packed in original overseas shipping boxes. Shpg. Wt. 3 lbs. Only **\$1.47**

## "DO YOUR XMAS SHOPPING EARLY"

To make sure of pre-Christmas delivery place your order now! Despite the holiday rush Walter Ashe will continue to ship the same day... often the same hour... following receipt of your order!

## IMPORTANT REMINDER!

Place your order now for the 1948 issue of ARRL "RADIO AMATEURS HANDBOOK" and EDITORS AND ENGINEERS "RADIO HANDBOOK."

## ALL THE BIG NAME BRANDS OF RECEIVERS AND TRANSMITTERS IN STOCK

(ready for immediate delivery)

## PERFECT TO GIVE... OR TO RECEIVE

A Walter Ashe Gift Certificate. Available in any amount from \$1.00 upward. Mailed without charge. Order yours today!

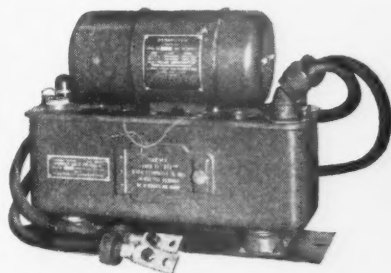
## "ZERO BEAT" by Walter Ashe

No matter how busy I am I make a point of spending a part of each day on the sales floor. This enables me to keep in close touch with the preferences of our customers, including the young fellows who are buying equipment for the first time as well as the old timers who have been doing business with us since 1922. Often the newcomer will volunteer, "My dad said I could get it at Walter Ashe," while the "regular" acknowledges, "I know I can always get here *what* I want... *when* I want it." My reply to both is: Depend on us to stock what you want and need at all times. And that's a promise!

## COMING!



**And Sooner Than You Think!**  
The new, bigger better Walter Ashe Catalog, featuring all that's new and best in Radio and Electronics. For "priority" delivery on your free copy ask to have your name placed on our mailing list.



## PE-103 DYNAMOTOR

WALTER ASHE still has that ideal power supply for your emergency set-up or mobile rig. Brand new in original overseas shipping crates genuine SURPLUS PE-103 DYNAMOTORS that deliver 500 Volts D.C. at 160 Ma. with either 6 or 12 volt D.C. input. Get yours while the fast dwindling SURPLUS supply lasts. Shpg. Wt. 81 lbs. Only **\$9.95**

**ALL  
PRICES  
F.O.B.  
St. Louis**

**Walter Ashe**  
**RADIO CO.**  
**1125 PINE ST. • ST. LOUIS 1, MO.**

## SURPLUS EQUIPMENT BARGAINS

- No. 1 • Filter Choke, 4 Hy, 300 MA, 400 ohms. Shpg. Wt. 12 lbs. **\$4.95**
- No. 2 • Plate Transformer, 1400/1200 VCT, 260 MA, Pri. 115 VAC. Shpg. Wt. 18 lbs. **7.95**
- No. 3 • Dual Choke, 12 Hy, 200 MA per section, 150 ohms. Shpg. Wt. 17 lbs. **4.95**
- No. 4 • Filter Condenser, 2 Mfd. at 4000 VDC. Shpg. Wt. 7 lbs. **4.50**
- No. 5 • RCA Modulation Xformer. For tubes up to 10,000 ohms P to P. Sec. No. 1 450 Ma for beam tube plates. Sec. No. 2 80 Ma for screen grids. Shpg. Wt. 55 lbs. **14.95**
- No. 6 • Filter Choke, 4.5 Hy, 150 MA, 70 ohms. Shpg. Wt. 5 lbs. **1.29**

**REMEMBER** your trade-in's worth more at the Walter Ashe store. So get Walter Ashe's offer before you make that trade!

## Other Super Bargains in Surplus Equipment

- Selsyn Motors, 115 VAC 60 Cy. Large continuous duty type. Shpg. Wt. 25 lbs. Pair **\$12.50**
- HV By Pass Condenser, Mica .002 x 3000 VDC. Shpg. Wt. 1/2 lb. **\$5.9**
- Filter Condenser, 3 MFD. x 440 VAC, good for 1500 VDC. Shpg. Wt. 3 lbs. **\$1.50**
- Plate Transformer, 2500 VCT, 150 MA, Pri 115 VAC. Shpg. Wt. 18 lbs. **\$9.95**
- Filament Transformer, 5 VAC at 25 Amps. Pri 115 VAC. Shpg. Wt. 9 lbs. **\$6.15**
- Filter Choke, 8 Hy, 500 MA, 55 ohms. Shpg. Wt. 28 lbs. **\$11.85**
- Plate Transformer, 1400/1200 VCT, 200 MA, Pri 115 VAC. Shpg. Wt. 18 lbs. **\$7.45**
- Filter Choke, 6 Hy, 1200 MA, 27 ohms. Shpg. Wt. 94 lbs. **\$17.95**
- Swinging Choke, 2 to 6 Hy, 500 MA. Shpg. Wt. 28 lbs. **\$11.85**
- Dual Filament Xformer, Two 5 VAC x 5.25 Amp Secs. Pri 115 VAC. Shpg. Wt. 8 lbs. **\$1.95**
- Plate Xformer, 3200 VCT at 525 MA. Pri 115 VAC. Shpg. Wt. 55 lbs. **\$29.95**
- Modulation Xformer, 30 Watts, Pri 5000 Ohms CT, Sec. 1750/2000/2250, Common B plus. Shpg. Wt. 6 lbs. **\$2.00**

WJWD • WJWM • WJPG • WJUL • W9NR • WJQD • WJYD

## Here's a Handy Chart FOR YOUR HAM SHACK



**MULTIPLYING COMBINATIONS  
FOR HIGH FREQUENCY  
BANDS WITH LOWER  
FREQUENCY CRYSTALS**

### 144 to 148 mc—2 meters

- 1—7200 to 7400 kc x 5 x 4 (x 5 x 2 x 2)
- 8000 to 8222 kc x 3 x 3 x 2
- 2—9000 to 9250 kc x 4 x 4
- 3—9600 to 9866 kc x 5 x 3
- 12000 to 12333 kc x 4 x 3 (x 3 x 2 x 2)
- 4—14400 to 14800 kc x 5 x 2
- 16000 to 16444 kc x 3 x 3
- 18000 to 18500 kc x 2 x 2 x 2 (x 4 x 2)
- 24000 to 24666 kc x 3 x 2
- 5—28800 to 29600 kc x 5

### 50 to 54 mc—6 meters

- 3125 to 3375 kc x 4 x 4 (x 2 x 2 x 4)
- 6—3333 to 3600 kc x 5 x 3
- 4166 to 4500 kc x 4 x 3 (x 3 x 2 x 2)
- 7—5556 to 6000 kc x 3 x 3
- 6250 to 6750 kc x 4 x 2 (x 2 x 2 x 2)
- 8334 to 9000 kc x 3 x 2
- 12500 to 13500 kc x 4 (x 2 x 2)
- 16667 to 18000 kc x 3

### (5) 28 to 29.7—10 meters

- 6—3500 to 3712 kc x 4 x 2 (x 2 x 2 x 2)
- 7—5600 to 5940 x 5
- 1—7000 to 7425 x 4 (x 2 x 2)
- 3—9333 to 9900 x 3
- 4—14000 to 14850 x 2

- 27160 to 27430 kc—11 meters
- 3018 to 3047 x 3 x 3
- 3395 to 3428 x 4 x 2 (x 2 x 2 x 2)
- 4527 to 4571 x 3 x 2
- 5432 to 5486 x 5
- 6790 to 6857 x 4 (x 2 x 2)
- 2—9054 to 9143 x 3
- 13580 to 13715 x 2

Ranges with similar number prefixes have portions good for two bands or more. For example, 7200 to 7300 is good for 40, 10 and 2; 9054 to 9143 is good for both 2 and 11, etc.

## A Better 10 METER CRYSTAL



**ALSO AVAILABLE IN 25 MC  
FOR DOUBLING TO 6 METERS**

No special circuits or special sockets required with this new third mode crystal. Any conventional triode or pentode circuit with low plate voltage will provide exceptional performance. Only difference from 20 meter crystals is that shorter, more direct leads essential for optimum efficiency.

Low drift, hermetically sealed, will withstand terrific vibration, small in size, will not age because of Knights "Stabilizing" process. 1/2" pin spacing.

**The JAMES KNIGHTS CO.**  
SANDWICH, ILLINOIS

receiving, the beam homes automatically — you only have to point it when you call CQ."

A weak "Oh" was about all Elmer could muster at that point. *That certainly explains why I feel a little dizzy, he thought.*

"If you want to call someone, just set that knob on your left to however many kilocycles high or low from his frequency you want to be. The rest is automatic."



**\* JUST PUSH THAT SWITCH  
NEXT TO THE KEY FOR TEN KW. \***

Elmer spotted the knob with a 0 at the top and a scale ranging + 20 and - 20 on either side. Just then he tuned across a signal calling CQ and signing a ZD9 call. The signal built up as the hill turned around and was an honest S7 as he signed. Elmer already had the frequency-set knob on 0 as he switched over and gave the station a short, confident blast. Switching back, he heard "W2QHH de ZD9 . . . R tux fer call — ur sigs RST 459 hr in . . ."

"Why, the so-and-so!" Elmer exclaimed. "Howie never ran more than 40 watts in his life, and I missed with this rig!"

"Didn't you raise him?" Joe asked innocently. "No, I didn't! How do I get this up to ten kilowatts?"

"That switch on your right, next to the key," explained Joe.

*This is Heaven, thought Elmer. Watch me knock him off.* He waited a minute, and as the W2 signed with an SK, Elmer called a snappy three-times-three on the frequency. The ZD9 came back with a "QRZ?" Elmer repeated the call, and the ZD9 was working W6VFR.

"Did you raise him?" Joe asked.

"No!" said Elmer. "What's wrong with the rig?"

"Nothing's wrong with the rig. You have seven-and-a-half kilowatts into a rhombic antenna aimed right at the guy."

"Then why didn't he come back?"

Joe smiled sadly. "They never come back. That's the Hell of it!"

**SWITCH  
TO SAFETY!**



# LEEDS The house you have known for 25 years

## General Radio Co., VARIACS

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V—10 1.725KVA 0-135v output, 10 amp.....	33.00
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ACN Vernier dial 5 x 7/4.....	\$2.98
AR—16 air spaced exciter coils, for 5-10-20-40-80 meters; end, center or swinging link.....	1.15
XB-16 Socket for above.....	.33

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Aerovox, type 1590-H-229 low loss, bakelite case; capacity 0.4 Mfd 600v EFF. 18 amps at 3000 KC; 25 amps at 100 KC. Special.....	95c
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100 Mmfd double bearing, silver plated, Isolantite insulation; can be ganged either end.....	29c
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25 Mmfd balanced stator one hole mtg. Isolantite insulation, polished plates; Swell for UHF.....	29c
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BC-1066A UHF 2 Band Receiver, battery operated, using  
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Crystal Mike, Guaranteed Perfect, complete except for Holder. A real buy.....	69c
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110 Volt Pilot Assemblies, Candelabra Base. Special.....	39c
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6 Volt Bayonet Base Pilot Assemblies with Dimmer. Red and White.....	19c
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Tunes 410/420 megacycles,  
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17 tubes, including 5/6J6,  
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.02 Mfd	8000VDC	Aerovox.....	.98
2 x 0.1 Mfd	600VDC	C. D.....	.25
10 Mfd	600VDC	G. E.....	.98
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2 Mfd	2000VDC	Westinghouse.....	1.75
16 Mfd	400VDC	W. E.....	.98
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1 Mfd	5000VDC	Solar.....	2.95
10 Mfd	1500VDC	C. D.....	3.50
2 Mfd	600VDC	C. D.....	.49

G. E. 200 AMP Relay, 24V coil.....	39c
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Sigma 4 Ma, 2000 Ohm, Plug-in relay.....	95c
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Bussman 8 AG 1/100 AMP Fuses, instrument type, per dozen.....	50c
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300 Twin Lead Indoor or Outdoor Cable, per 100 feet.....	\$2.95
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Ouncer Transformers, Mike to Grid, 25:1 RATIO Low to High Impedence.....	35c
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IN21B Crystal Diodes 35c ea. 3 for.....	\$1.00
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39" Telescoping Antenna.....	25c
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J-37 Telegraph Key, 1/8" Silver Contacts.....	49c
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Heinemann Magnetic Type Circuit Breakers, 3 and 5 AMP Sizes.....	95c
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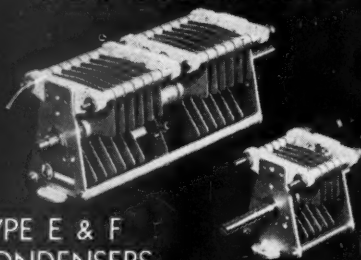
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Heavy aluminum plates .032" thick, with rounded edges for maximum voltage rating. . . Heavy aluminum tie rods  $\frac{1}{4}$ " diameter for frame strength and rigidity. . . Steatite insulation. . . Stator mounted above to reduce capacity to ground. . . Heavy phosphor bronze contact springs, cadmium plated. . . Center contact on dual models. . . Chassis or panel mounting. . . Stainless steel shafts. . . Front and rear shaft extensions permit ganging. In addition to mounting foot shown, removable single hole brackets are furnished so condenser may be inverted from position shown, or other components mounted above.



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## 50 Mc.

(Continued from page 61)

235 Mc., having changed from 144 Mc. at 9:30. Their contact was heard by W2JWO, Patchogue, L. I., who hastily put back in service an oscillator rig he'd discarded. A not-too-readable signal (for the sharp superhets at CTW and DAH) resulted, but at least it made possible something new in 235-Mc. circles—a four-state round-table QSO!

### V.H.F. MARATHON

Contacts Through October 15th

States  
Worked in  
1947

Call	50 Mc.	144 Mc.	235 Mc.	Score	50 Mc.	144 Mc.
W1AF	157			1159	24	
W1BCT		245	2	1132		8
W1CGY	139			1625	33	
W1CLS	294			3587	42	
W1HDQ*	251	149		4459	39	9
W1HMS	117	10		1329	33	1
W1KLR	156			907	5	
W1PEN	130			1177	8	
W2AMJ	260			2355	37	
W2BYM	302			3278	37	
W2CBB	250			1152	8	
W2COT	85			1029	11	5
W2DZA		172		229	1160	6
W2NLY**		635	14	5794		10
W2QVH	245	174		2830	35	5
W2RSO		228		2151		8
W3GKP	39	138		1724	10	8
W3HWN		216		1986		9
W3MHW		208		1404		6
W3RUE	99	96		2255	31	4
W4FJ	72	53		1956	26	9
W4WMI/4	248	5		3409	33	2
W5ESZ	70			942	28	
W5FSC	132	22		2385	34	1
W6BPT	62			1278	23	
W6BWG	143			968	11	
W6HZ	128	298	1	1923	13	1
W6OVK	109	183	4	3548	29	1
W6WNN	132	8		2213	24	1
W7ACS/KH6	27			1177	3	
W7QAP	137			2380	25	
W8RFW	84			1084	26	
W8UKS		165		4258		8
W8WJC		149		4830		8
W9AB	70	13		877	22	3
W9AGV		73		596		5
W9ALU	101			1034	32	2
W9JMS	246	10		2887	36	3
W9ZHL	333	8		5309	43	3
W0QIN	238			3323	43	

\* Not eligible for award.

\*\* Ninth period winner: W2NLY, 1572 points.

Activity is building up on 235 Mc. in the Boston area, and Thursday and Sunday nights at 9:30 are regular operating periods. Active stations include W1OOP, Boston, W1KIM, Winthrop, and W1PRZ, Milton, in addition to W1CTW. All have crystal control. W1OOP uses a 6L6 oscillator-tripler, a p.p. tripler using 6AQ5s, an 829 tripler, and an 829 final, running 75 watts input. W1KIM has converted an ARC-5 to work on 235 Mc. The gear used at W1CTW is described elsewhere in this issue.

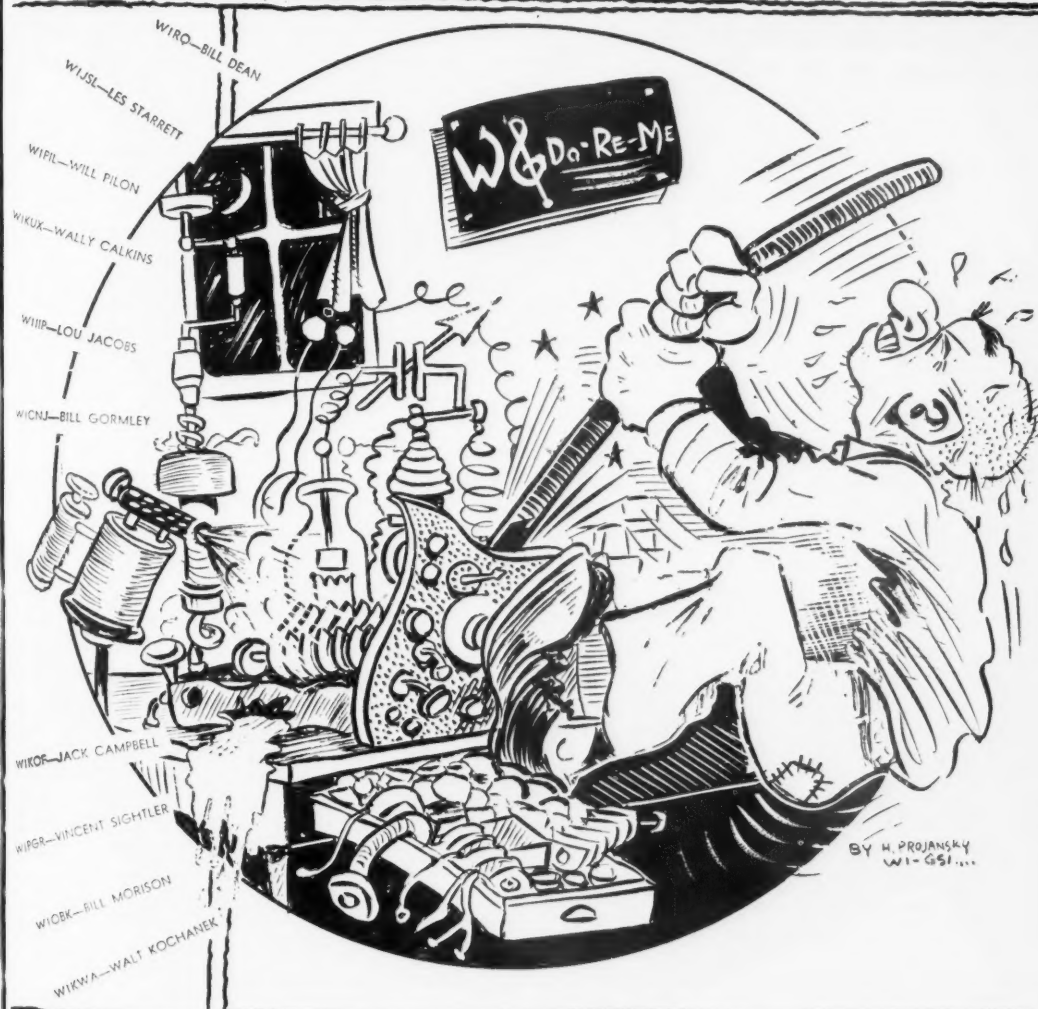
(Continued on page 128)



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## 420-Mc. News

There are numerous surplus rigs designed for the 400-600 Mc. range which may be converted to amateur 420-Mc. service, and much of the activity in this band has been with such gear. Another, reported by W6DEY, Santa Ana, Calif., is the Navy ASB-6. With this job he is working W6DJW at Altadena, who uses a pair of 8025s in a line oscillator, feeding 8 half-waves in phase with a screen reflector. A 420-Mc. net is active each Friday night at 8:30 PST, with W6DJW as master of ceremonies. He starts out using the high end of the 2-meter band, until all the 420-Mc. gang check in. He leaves his 144-Mc. rig running as he tunes 420, permitting all the stations to know at once who is calling in. Several in locations such that they are unable to hear one another direct are able to QSO via W6DJW. Active stations include W6s UXC, Glendale, YMW, Los Angeles, BOB, Redondo Beach, and VDE, Downey.

## New Microwave Records

Just about any line-of-sight path should be workable on our microwave bands, but until October 5th all our microwave work had been over distances under 50 miles. Though W1LS and W1JSM already held the record for 2300-Mc. communication, they decided to see what could be done over greater distances. With W1JSM/1 at Mt. Wachusett, and W1LS/1 on Mt. Greylock, 66 miles apart, solid contact was established at 12:45 P.M., with signals S9 each way, despite a power output of less than 100 milliwatts. At 3 P.M. the same day, W1OTH/1 on Mt. Greylock put his 3300-Mc. rig on and worked W1JSM/1 with S8 signals each way. This was good for only an hour or so, however, as the W6IFE/6-W6ET/6 record of 150 miles, reported last month in brief form, was made on the same afternoon.

Plans for the California expedition were laid during nightly sessions on 75-meter 'phone. W6ET's location was near the lookout tower on the east peak of Mt. Hamilton, a 4100-foot elevation. Equipment consisted of a klystron oscillator with an output of approximately 20 milliwatts on m.c.w. or f.m. voice, a 4-foot parabola, and a portable 75-meter rig. W6IFE/6 was set up at a 5000-foot elevation near the western boundary of Grant National Park, using a light-house rig, an 18-inch parabola, and portable gear for the 75-meter check circuit. Contact was established on 75, changing to 3370 Mc. at 1 P.M., continuing for 25 minutes. Another QSO, of more than an hour's duration, was carried out later in the afternoon. Assisting at the northern end of the circuit was W6VBJ, who sent in the details of the expedition, as reported above.

## V.H.F. Sweepstakes, January 17th-18th

To help stimulate activity on the v.h.f. bands at a time when it is normally somewhat low, we are planning a new contest to be held on January

(Continued on page 130)

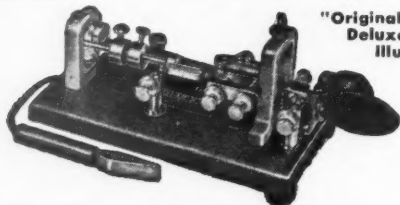
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# Atlantic City Documents!

AT THE REQUEST of the General Secretariat of the International Telecommunication Union, this society is acting as the distribution agency for the public sale in the Western Hemisphere of the Final Acts of the Atlantic City International Telecommunication and International Radio Conferences. The League is performing this work on a nonprofit basis as a public service to the telecommunication interests of the American Region, to make the documents available sooner and more conveniently than if orders had to be sent to Switzerland.

These Final Acts comprise the new International Telecommunication Convention, the International Radio Regulations, and all of their respective Appendices, Annexes, Protocols, Resolutions and Recommendations, including their illustrations. They are the source material on which the regulation of international radio communication will be based for some years. Of indispensable reference value to all those concerned with the administration and control of communications, the amateur and general student will also find them of interest and assistance in understanding world communication problems.

The price, set by I.T.U., is \$1.20, postpaid, to governments and government agencies, \$1.50 to all others (such as private operating agencies and individuals). Remittances should be made payable to the undersigned society and must yield the appropriate amount net in U. S. funds. Remittance must accompany order — except that in the case of government agencies of the American Region which find themselves unable, through their internal regulations, to send remittance in advance, the League will honor the order and advise the General Secretariat of the Union at Bern to bill the government agency direct. Page size  $5\frac{7}{8} \times 8\frac{1}{4}$  inches, white paper, heavy paper covers. *Now available in two editions; specify which is desired:*

**French-English Texts:** The official texts of the conferences, facing pages in parallel in the two languages, set in type, letterpress-printed, about 1100 pages.

**Spanish Text:** A limited quantity is available of a Spanish translation prepared by the Conference Secretariat. Produced by planograph lithography from typewriter text copy but including all illustrations and charts; about 530 pages.

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Alloy Case-Black  
Alumilite finish

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Hermetically Sealed  
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17th and 18th. Insofar as possible it will follow the Sweepstakes form. The idea will be to get on and see how many stations you can work; there will be no complicated scoring and distance multipliers. Plan now to be on deck, with gear to work in as many of the bands above 50 Mc. as possible. Complete details in January QST.

## Correspondence

(Continued from page 68)

is in line with fundamental amateur policy never to grant exclusive 'phone assignments.

Starting with 80 meters, let's first take care of our traffic handlers and network operators with an exclusive c.w. allocation, seven days a week, from 3500 to 3650 kc. The balance of the band, 3650-4000 kc., can be assigned to c.w. exclusively every other day. At 3:30 A.M. CST (at the end of such a c.w. assignment) 3650-4000 kc. will be open for 'phone and c.w. until 3:30 A.M. CST of the next day, when exclusive c.w. operation will be resumed for another 24-hour period over the entire 80-meter band.

On the days that 80 is devoted to c.w. exclusively, open up the entire 40-meter band for 'phone and c.w. On the alternate days, it will revert to c.w. only. Treat 20 meters the same as 40 meters, abolishing the present 'phone-c.w. subdivision; c.w. to be used exclusively the same days that 80 is devoted to c.w. exclusively, and the entire band to be opened to 'phone and c.w. on the alternate days.

Leave things as they are on the 11-meter band. We can already operate with all types of service on this band simultaneously.

Allocate 28-29 Mc. to c.w. exclusively on the days that 40 is devoted to c.w. exclusively. On alternate days turn this part of the band over to 'phone and c.w. Create a new frequency subdivision, permitting 'phone and c.w. operation from 29-29.7 Mc. seven days a week. This will give the Class B 'phone men the counterpart of the exclusive 80-meter c.w. assignment. Every other day the whole band will be open for 'phone and c.w.

Last, but not least, abolish all "sub-sub 'phone bands" that are now segregating one group of 'phones from another. Permit any type of voice modulation on all four bands that meets the present FCC rules on allowable sideband width. Retain the Class A license requirements for 80- and 20-meter 'phone operation, and also require it for 40-meter 'phone operation.

A small wave of protest against this or similar proposals can be expected from those who are just "agin" change, and those who "have worn a single frequency thin" for these many years. On the other hand, it seems to me that the huge majority of progressive American amateurs with their multiband transmitters and receivers will have more fun than a barrel of monkeys operating under such a plan. New worlds to conquer! New contests to enjoy! New friends to meet! And much more to learn about our fascinating hobby.

The one point on which we will get as many different points of view as there are amateurs, is how such a plan will affect our fellow-amateurs outside the U.S.A. They can, of course, supply the best guesses themselves. Inasmuch as they are perpetually encountering a barrage of American-made QRM, both 'phone and c.w., the utilization of our popular DX bands in their entirety (except 3500-3650 kc.) one day on 'phone and c.w., and the next one c.w. exclusively, will spread us Yanks out much thinner than ever before. It is safe to assume that the majority of overseas amateurs using 'phone are equally at home on c.w.; therefore, it seems reasonable to guess that we would not only help ourselves with our own QRM situation, but also are likely to enjoy more DX contacts than ever before as our interference pattern abroad would be altered so that our DX friends could do a better job of separating us.

I suggest that every ham sit down and tune in on the 80-40-20- and 10-meter bands and do a little crystal gazing in "time and frequency" as you check over the points listed above. We have nothing to lose and quite possibly a lot to gain in developing a long-term plan backed up by

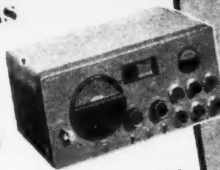
(Continued on page 132)



## NEW RECEIVERS IN STOCK!

### HALLICRAFTERS

S-38	\$47.50
S-40A	89.50
SX-42	275.00
R-42 spkr	29.50
SX-43	169.50
SP-44	49.50
S-47	200.00



### NATIONAL

NC-46 with speaker	107.40
NC-57 complete	89.50
NC-240-D with speaker	241.44
NC-173 with speaker	189.50
HRO-7 with speaker and pwr. supply	311.36

### HAMMARLUND

HQ-129-X with speaker	189.15
SPC-400X with speaker and pwr. supply	398.25

### RME

RME-45 complete	198.70
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RHF-152 converter	86.60
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Indispensable for complete, accurate radio servicing and testing! D.C. sensitivity of 20,000 ohms per volt, 1000 ohms per volt AC. Ranges: AC & DC—1000 5000 volts; 0-2000 .2 meg 20 .1 volt AC. Ranges: —10 + 52 db; current readings from 1 microampere to 500 milliamperes. Your cost In Roll Top Safety Case

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VFX-680—Crystal exciter, VFO, VFX, narrow band FM phone on all bands, CW and phone monitor, dual tuning eye—all in one, complete with tubes and coils, less crystal 87.45  
XE-10—Will convert any CW rig, regardless of power, to narrow band FM! Can be heard on any AM receiver, penetrates QRM, eliminates BCI! Less crystal 39.45  
MB-611—Portable-mobile rig for 6 or 10-11 meters. 40 watts input with a pi-network to match any antenna. Uses 40 meter crystal, features Sonar NBFM. Complete with tubes and coil for either band, less power supply and crystal 72.45

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Type	Audio Power	Net Price
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T-21M62	125 watts	27.93
T-21M64	300 watts	47.04
T-21M65	500 watts	

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90810—New HF transmitter for 10, 6 and 2 meters. Uses 6AG7, 2E26 and 829B tubes. 75 watts output. With 10 meter coils, less tubes and power supply 69.75

90800—50 watt all-band transmitter/exciter, uses 6L6 and 807. Complete with 10-11 meter coils. Net 42.50

92101—Famous R-9'er, automatically boosts any impedance antenna up to 30 db. Broad band r.f. amplifier for additional 30 db. gain. Complete with 10 meter coil, less tube. 24.75

6AK5 tube

### BLILEY CCO Model 2A

Excellent crystal controlled oscillator for 2-6-10-11 meters. Uses new Bliley AX3 for 6 and 2 meters. CCO-2A, less tube and crystal 9.95

6AG7 tube for above 1.66

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1000	20,000	60,000
5000	25,000	80,000
10000	30,000	90,000
ohms	each	5 megohm 75¢
100,000		1 megohm 89¢
125,000		
200,000		
400,000		

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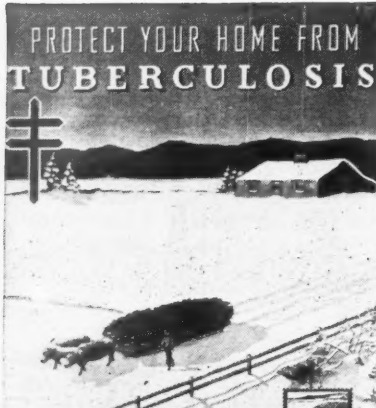
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TRANSFORMER CORP.  
ELYON KEDZIE AND ADDISON, CHICAGO, ILL.

PROTECT YOUR HOME FROM  
**TUBERCULOSIS**



Buy  
*Christmas Seals*

some bona-fide tests. Certainly we will enjoy a lot of novel experiences and DX contacts during a 60-day test period. Wouldn't it be fun to give it a whirl? Let's get *en rapport* with Rapp! Take your pen in hand, fellows!

Staggeringly, but seriously yours,

— D. A. Griffin, W2AOE

## QSLs

314 W. St. Johns, Lake City, Fla.

Editor, *QST*:

I've sent out approximately 800 QSL cards in the past year, over-all dimensions of 4 × 6 inches. A one-cent stamp was placed on those destined within the United States. None of these was returned until today, when three of them bounced back with "postage due 2 cents."

On checking with the post office I was told of a regulation that has been on the books for a long time: "Post cards manufactured by private persons, consisting of an unfolded piece of cardboard in quality and weight substantially like the Government postal card, not exceeding in size approximately 3½ × 5½ inches, nor less than 2¾ × 4 inches, bearing either written or printed messages, are transmissible without cover in the domestic mails at the postage rate of 1 cent each."

Since I've received many cards exceeding the dimensions above, with only one-cent postage, I'm wondering if some other interpretation might be made by some other post office, or a general ruling handed down from Washington, D. C., settling this point definitely?

— Albert G. Snow, Jr., W4IQV

[Editor's Note: Local offices may let oversize cards slip through occasionally, but to be sure of acceptance by the post office, amateurs should instruct QSL printers to cut cards not more than 3½ × 5½ inches.]

40 Crescent Rd., E. Orange, N. J.

Editor, *QST*:

Recently I received a batch of prewar QSL cards via the ARRL bureau, conducted by Hank Yahnel, W2SN, Helmetta. One card was 11 years old; two dated back 10 years, and one, nine years. In an enclosed note, Hank pointed out that he is still holding all cards not sent for and has no intention of destroying them. Several of my cards are particularly valuable, coming from Poland and Czechoslovakia. . . .

— Louis J. Varson, W2VC

[Editor's Note: Moral — keep your QSL manager supplied with self-addressed stamped envelopes.]

Port au Prince, Haiti

Editor, *QST*:

. . . I receive on an average of 15 SWL cards in the course of 3 to 4 days. One day I received 22 SWL cards and 3 QSLs; needless to say the SWL cards were filed in the nearest wastebasket. As far as the reports go, they don't mean much and most of them are very funny — as for instance one I got gave me Readability 9, Strength 5, tone strong, with a three-element rotary beam in the bargain!

In the future, as at present, I shall continue to disregard SWL cards, and while I understand the thought in sending them, the necessity to withhold answering them is obvious. Another thing is the fact that the post office here will not accept postage coupons for stamps and the 9-cent coupons which I receive are worthless to me and are only a waste of money to the guys sending them. I have a whole shoe box full of them which I am saving. . . .

I intend to QSL all contacts that are made on the air and hope in the near future to be caught up on the card situation, but at the moment I am over 350 cards behind and more are coming in every day. Printing prices are nearly prohibitive here and I have to have my cards done outside the country and that sometimes takes months.

— C. E. Watson, HH8CW/W1LHA/W4HRN

## "PHONE PHUNNIES"

St. Raphael's Rectory, Dubois, Ind.

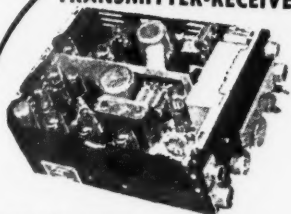
Editor, *QST*:

The "Phone Phunnies" in August *QST* struck me unfavorably and as having a cynical tone. I do not believe that the hams who have fallen into the unpleasant habit of saying

(Continued on page 134)

# RESCO HAS IT-FOR LESS!

## BC 645 ULTRA HI-FREQUENCY TRANSMITTER-RECEIVER



You Read About It in Feb. QST!

Originally operated in the frequency band from 450 to 500 MC. Can be converted to 420 MC amateur band. Consists of complete transmitter and modulator system, and receiver. Instructions for conversion to AC supply. Complete with 15 tubes.

**1495**

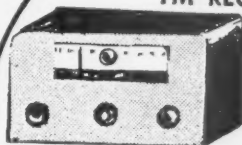
## NEW SHURE T-17B MICROPHONE



Single button mike used by armed forces. Perfect speech qualities. For portable rigs or simplified home transmitter, or where carbon mike is specified. In original cartons. With rubber covered 5-ft. cord and plug, cover, and switch.

**149**

## Meissner's BREWSTER MODEL FM RECEPTOR

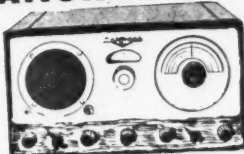


Adds frequency modulation to any regular AM set. Complete with 8 tubes **38.33**

AUDIO FIDELITY — Flat within 2 DB from 50 to 15000 C.P.S.  
ANTENNA INPUT Impedance—300 ohms  
SENSITIVITY—40 microvolts  
CONTROLS—Tuning and combination volume control—line switch  
POWER SUPPLY—105 to 125 volts, 50 or 60 cycle AC

## NEW .. NATIONAL NC-57

Complete **89.50**



For hams and SWL's. Features tuning range from 550 KC to 56 MC continuous in 5 bands. Electrical bandspread and accurate calibration; automatic noise limiter; antenna trimmer; voltage-regulated RF. Local tubes in RF circuits. 6" dynamic speaker; tone control; 1 RF stage, 2 IF stages. 7 tubes plus VR tube, rectifier.

### OTHER RECEIVERS FOR QUICK DELIVERY

NATIONAL	HAMMARLUND
NC-46, with speaker	HQ 129X, with speaker
<b>107.40</b>	<b>189.15</b>
NC-173T, with speaker	SPC-400-X, with speaker
<b>189.50</b>	<b>398.25</b>
NC-2-40T, with speaker	RME
<b>241.44</b>	RME 84 <b>98.70</b>
HRO-7T <b>279.00</b>	RME 45 <b>108.70</b>
Speaker <b>12.00</b>	
Power Supply <b>20.36</b>	

### HALLICRAFTER

S-38	<b>47.50</b>
SX-42	<b>275.00</b>
S-47	<b>200.00</b>
S-40A	<b>89.50</b>
R-42 Speaker	<b>29.50</b>
SX-43	<b>169.50</b>
R-44 Speaker	<b>17.50</b>

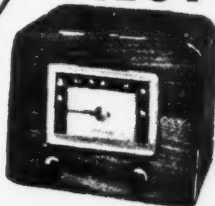
## HEADSET



Army Signal Corps. complete with leather headband, rubber ear-cushions, cord and plug. 2000 ohms D.C. resistance. Fully adjustable.

**1.49**

## Listen to FM Stations with PILOTUNER



A complete tuner less audio system.

**2995**

PILOTUNER features:  
3 gang copper condenser — Heavy duty transformer — Own power supply  
— Tuned R.F. stage — Walnut cabinet — 8 3/4" wide;  
6 3/4" high;  
3 3/4" deep.

## Western Electric

### 0-1000 DC MILLIAMMETER



Standard 3" Round Case **2.75**  
Has extended scale typical of Western Electric meters. Can be read with accuracy up to 10 mil multiples.

## Burgess De Luxe VIBRO TOOL



Complete with 22 attachments and case. Engraves on metal, glass, stone, plastics. Cuts patterns on cloth, rubber; tools leather, etc.

With Needle 110 V AC, 60 Cycle—**9.90**  
Alone 4.50 No. V 150, Complete

## "RADIOGRAPH"



Includes a complete kit of parts with earphone to build crystal receiver. Also 3-way telegraph outfit (blinker, buzzer, sending, one receiving, through earphone. Complete with instructions and radio dictionary.

**195**

Write for Big Free Bulletin

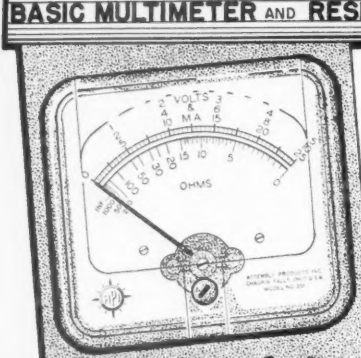
# Radio Electric


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See these at your jobber! ask for a circular.

#### BASIC MULTIMETER

Crystal clear plastic front

0-1 Milliampere  
0-100 Millivolts  
100 Ohms internal resistance

Catalog No. 351-1 net price \$7.50

#### BASIC RESISTOR KIT

Includes shunts and multipliers for following ranges:

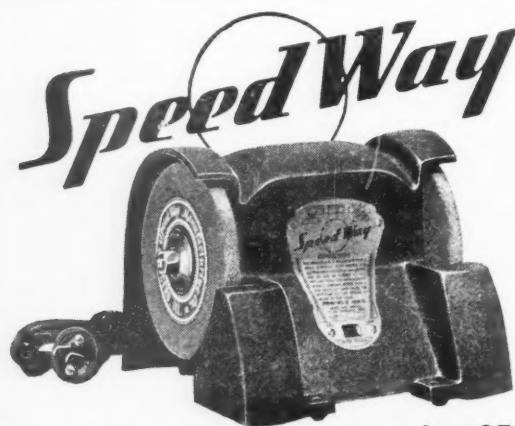
DC Volts 0-10-50-250-500-5000  
DC MA 0-1-10-100-1000  
Ohms 0-1000-100000-10 meg.  
(Mid scale ohms 12-1200-120000)  
All resistors 2%

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**ELECTRICAL INSTRUMENTS**

Other API panel meters  
1 1/2, 2 1/2, 3 1/2 Sizes  
Round-Square.  
AC-DC

ASSEMBLY PRODUCTS INC.  
Chagrin Falls, Ohio, U.S.A.



### No. 117 portable bench grinder \$14.95

Light, handy, efficient for workshop, garage or factory. Self-contained grinder with 1 fine and 1 coarse (4 1/2" x 3/4") grinding wheels.

New powerful shaded pole motor operates at correct speed. Self-aligning bearings, 1-piece cast aluminum housing has integral wheel guards, tool rests and switch. Plugs into any 110-120 A.C. circuit.

No. 69 Electric Drill, drills holes up to 1/4" in steel. Die-cast, pistol-grip makes it natural to drill straight holes. Has specially wound high torque motor, only \$11.80.

Ask your dealer to show you the complete line of Speedway Blue Line Portable Electric Tools.

No. 69

1/4" Drill

\$11.80



**SPEEDWAY MANUFACTURING CO.**  
1826 S. 52nd Ave., Cicero, Ill

"O.K. on this, and O.K. on that" are "congenital liars" for the reason ascribed by W9EGV.

In our method of voice contacts we alternatively speak and listen, but not immediately alternately as on a land telephone line. We speak at some length and then stop talking to hear the comments. This is the usual method in amateur radio communication by which conversation alternates from one person to another, and although it is not essentially different from a land-line telephone it is, nevertheless, different. This difference does not necessitate the use of "O.K. on so-and-so" but it does make occasion for it, especially if one is not a "smooth" talker.

As I see it, the ham who uses the tautological form referred to in that article is trying to be courteous. He has tried to be a good listener when the other fellow was talking to him. If, then, he comes back with "O.K. on so-and-so" before each point on which he comments, I must admit that he has been a good listener, and I am glad to know he has heard and understood the things of which I spoke.

Therefore, it is his method of speech that would — and should, perhaps — incur criticism. On the other hand, a few hams are professional speakers who know how to make a smooth transition from one subject to another. His method of speech has been confused with his motive to justify himself, and the latter is purely an unqualified assumption. For a more constructive criticism I would say the "O.K.-on-so-and-so" preamble should merely be dropped, and the comments made simply. . . .

Rev. Joseph A. Terstege, W9LQB

1810 Spear St., Logansport, Ind.

Editor, QST:

. . . These articles are intended to satirize some of the idiosyncrasies heard on our bands. Toes will inevitably be stepped on; loud cries will be heard. . . .

I prophesy that every "phunny" will draw irate comments from someone; so you will have to brace yourselves and remember that as we kids used to say when we poured peroxide on a raw sore: "There must have been a lot of poison in there; look at it boil!" . . .

— John T. Frye, W9EGV

### FLOOD COMMUNICATIONS

War Department, Corps of Engineers  
1400 Textile Tower, Seattle, Wash.

Editor, QST:

During the recent flood on the Kootenai River at Bonners Ferry, Idaho, two amateurs rendered extremely valuable service in the maintenance of communications between Bonners Ferry and Seattle, Washington: H. M. Buroker, W7QC, and Oliver G. Coburn, W7JZV. A communication schedule was set up between these two stations and the Alaska Communications System located in Seattle so that the District Engineer, Seattle District, Corps of Engineers, U. S. Army, who was in charge of Government assistance in combatting the flood, could be kept in constant touch with what was going on at Bonners Ferry. . . .

— W. R. Shuler, W7BE  
Colonel, Corps of Engineers

### ATLANTIC CITY, ETC.

Lock Box 1221, Southern Pines, North Carolina

Editor, QST:

Let me say right here I believe that you have done a good job under very trying conditions; in fact I am surprised that you have been able to do as good a job as you have under the circumstances, even though I have been sarcastic with you. You know my chief difference with you is that ARRL did not always keep the ham posted on what has been expected and in store for hams.

Have waited with interest the latest issue of QST; this, with the latest Bulletin 108, gives a picture of what we can expect. Hams have been hurt; all of us will admit that; however, QST's alibi, that others were hurt, is no balm for the hams. Our military services have been hurt, they have lost also, but if you are at all familiar with their strategy, they always ask for 100% more than they need, hoping that in the mixup, they will get 75% of what they ask for, and this they generally do, which is 25% more than they need.

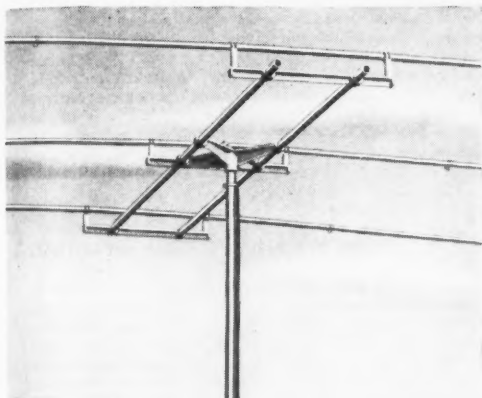
(Continued on page 138)



**WE'RE ON THE BEAM-ARE YOU**

## OUR CHRISTMAS SPECIAL

### THE ARROW 6-10-11 MTR 3 ELEMENT BEAM



- ALL ALUMINUM  $\frac{3}{4}$ " TUBING.
- ALL ALUMINUM CASTINGS.
- RIGID CONSTRUCTION.
- FED WITH 72 OHM COAX AVAILABLE FROM OUR SURPLUS STOCK AT LOWEST COST.
- SUPPLIED WITH 6' MAST OF STANDARD PIPE. EASILY ADDED TO.
- SEND \$5.00, BALANCE C.O.D. IMMEDIATE SHIPMENT.

COMPLETE WITH 50 FT. OF 72 OHM COAX AND INSTRUCTIONS **\$29<sup>50</sup>**

**THIS BEAM IS MADE FOR AND ON SALE EXCLUSIVELY AT ARROW**

#### ANOTHER ARROW SCOOP!



#### OIL FILLED CONDENSERS

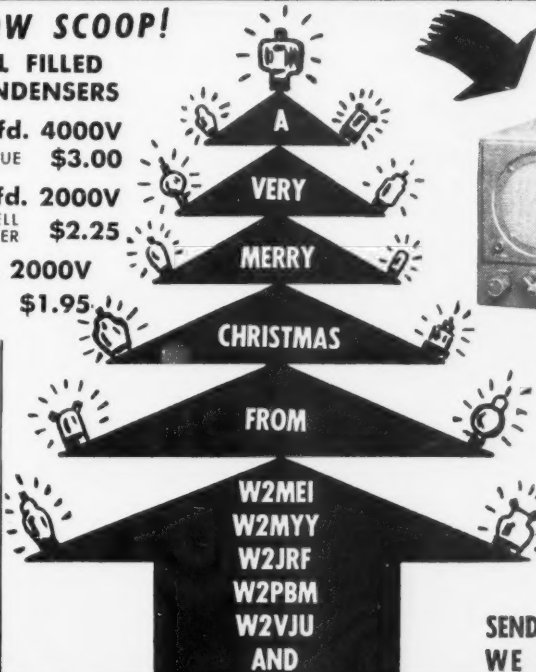
3 mfd. 4000V  
SPRAGUE \$3.00

2 mfd. 2000V  
CORNELL DUBILIER \$2.25

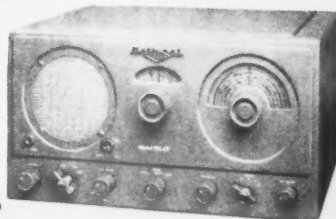
1 mfd. 2000V  
CORNELL DUBILIER \$1.95

#### VISIT OUR NEW SOUNDPROOF HAM SHACK

All Receivers, Converters, and Transmitters, IN OPERATION. Don't buy blind, try 'em first and compare under actual on-the-air conditions in our soundproof ham shack. Five hams to assist you. Immediate C.O.D. deliveries or easy payments. Liberal trade-in.



#### NATIONAL'S NEW NC-57



AMATEUR NET, **\$89<sup>50</sup>**

At LAST, the inexpensive communications receiver you've waited for! A REAL HAM RECEIVER! Covers the Broadcast Band to 56 Megs. in five bands. Voltage regulator, noise limiter that works. Write for Literature.

SEND \$5.00, BALANCE C.O.D.  
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# QST

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You should have at least two of them — one for your complete 1947 file of copies, and one for each 1948 issue as published.

With each Binder is furnished a sheet of gold and black gummed labels for years 1927 through 1947. The proper one can be cut from the sheet and pasted in the space provided for it on the back of the binder.

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**THE AMERICAN RADIO RELAY LEAGUE**  
West Hartford, Conn.

I cannot see that our commercial services have been hurt at all; in fact, they have more than they expected. No, Warner, the ham has paid and paid through the nose.

Now, our job, your job, everybody's job, is to create harmony within the ranks of the hams — this can be done if ARRL will admit their sins and the hams will admit their sins — and start anew. All of us have procrastinated; we need a "new deal."

First it is for ARRL to admit that they are the mouthpiece of the hams and that they are neither autocratic or bureaucratic — that they are only the mouthpiece of the ham (and I mean the hams that are members). Next it is for the hams to elect as their directors stable businessmen, men who cannot be swayed by propaganda or pressure. With ARRL, directors and hams working hand in hand, we can look forward to a happy future.

One of the questions that comes up, is the fact the 'phone hams think that ARRL has favored c.w. — I believe this myself. It is up to ARRL (and you know that FCC is going to do just what ARRL recommends) to divide the bands 50/50, all of them. As you know, there is a lot of unrest throughout the ham fraternity. The next move is up to ARRL — you hold the key — you can either break or make the hams.

— Calvin H. Burkhead, W4GTH

908 N. Doheny Dr., Hollywood 46, Calif.

Editor, QST:

Regarding the Atlantic City conference, I would like to see the western hemisphere join the other countries in requesting a limited band for amateurs in the 160-meter region. I realize that Ioran is used on this frequency range; however, I understand that it is used on a sectional basis: a hundred kc. in one section of the country and another hundred kc. in another part of the country. FCC could assign in each section the channel not in near-by use. I would like to see the assignment giving a power limitation of ten watts with the stipulation that no interference be given to Ioran. This would permit local rag-chews for the amateur and clear the DX bands from local contacts. I know that quite a few amateurs would like this better than the v.h.f.s for local rag-chews. . . .

— Leonard Burton Gardner II, W6URW

[EDITOR'S NOTE: Don't think we haven't been plugging just that, OMs. E.g., see page 118, July 1946 QST. Engineering tests so far, however, have not shown that it is possible to share with Ioran on a geographical basis. The studies continue. So do we.]

c/o Radio Station WKSX, Pulaaki, Tennessee

## DX PROCEDURES

4010 River Drive, Houston 12, Texas

Editor, QST:

This is an open letter to W6Q —.

Your displeasure at hearing OX3— answer my call last evening is understandable. As I get it from a friend who was in on the affair earlier, W1— was trying to guide OX3— to your signal. You apparently work with one of those "I'll scratch your back and you scratch mine" closely-knit monopolies that considers any DX contact one of you can manage should be the exclusive property of the corporation until the poor guy has been wheedled or bullied into working all the elite membership. Here we take a dim view of such shenanigans and feel more pride in raising an occasional DX without benefit of mass attack.

While your peevishness is your own business, your subsequent action was not only unwarranted but illegal as well. I respectfully suggest that the next time you decide to QSY and deliberately QRM someone's QSO, you refrain from announcing your intention while in the act. Not only does the FCC have monitoring stations but the next victim may turn the case over to your R.I. for appropriate action; an idea that I found very attractive and discarded with reluctance only after reading the severe penalty in the law for intentional interference.

There is also food for thought in the possibility that your T7/T8 signal may have had something to do with your failure. You seem also to hold a membership in the old school (a school with several distinguished members by the

(Continued on page 138)

# BUILD A 1/2 KW RIG

(phase NFM and CW)

FOR  
ONLY

75¢

PER  
WATT

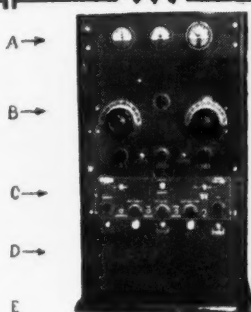
## A Sensational, New Buck Stretchin' KIT

INCLUDES:

- Bandswitched R.F.
- Power Supply
- NFM ECO Exciter (Sonar)
- Relay rack
- Illuminated meters

SUN RADIO'S PA-500 — only 36 3/4" tall!

Amazing, but true. This complete, compact, high powered rig can be yours at the unbelievable cost of only 75¢ per watt. Incorporates latest developments and circuits. Designed and tested by Walt Zuckerman, W2LBF, Manager of Sun Radio's Ham Dept. It's on the air now. Listen for it.



HERE'S THE WHOLE RIG

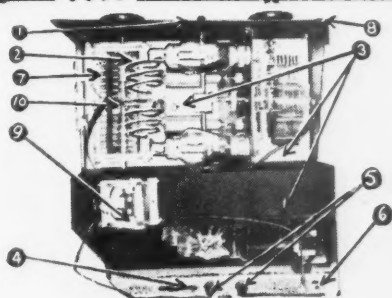
### Check these Features

- The new Simpson illuminated meters read buffer grid current, buffer plate and final grid current, and final plate current.
- R.F. section has symmetrical controls on front panel, which adjust final grid tank, band switch 10-11, 15, 20, 40 and 80 meters. Excitation control adjusts proper drive to 8005's when different bands are used. Illumination switch for meters. Buffer plate tuning. Send-receive switch transfers antenna, power and receiver in one operation. Center meter switch to read either buffer plate or final grid current.
- Recommended Sonar VFX 680 NFM exciter. (Any unit capable of delivering 1/2 watt on all bands is applicable.)
- Heavy duty power supply delivers 1250V at 500 ma plus 700V tap at 100 ma. Kenyon T line transformers throughout. Swinging and smoothing chokes plus 6 mfd. of filter. Has high voltage relay which removes plate voltage from final when neutralizing. Power relay operated by send-receive switch or remote switch breaks input voltage to primary of plate transformer. Fused line input.
- Standard streamlined Relay Rack 36 1/4" x 22" x 15" overall. Rear and top doors have safety interlock system.

Complete kit of parts includes all components, tubes, meters, coils, panels, chassis, wire, Power Supply components, instruction manual, schematics and drilling templates. Less Sonar VFX-

680: 60c. per watt.....	\$299.50
Sonar VFX-680: .....	\$87.45
75c. per watt	Total \$386.95
Rack dolly .....	\$ 8.25

When ordering specify black or grey.  
Prices subject to change without notice.



R F SECTION

- Single panel control, bandswitches both 807 buffer and PP8005 grids.
- Total high power R.F. wiring length per tube is 1 1/2" which includes connections between neutralizing condenser, tank condenser, tank coil and 8005 plate, insuring minimum losses and maximum efficiency.
- Novel layout offers 3 separate shielded sections isolating the 807 buffer and bandswitched turret, the 8005 grids and band-switching turret and the 8005 plate and tank section.
- Polarized receptacle for connecting the separate illuminated meter panel.
- Safety high-voltage connectors.
- Ceramic insulated 807 excitation input to connect Sonar VFX-680 or any exciter delivering at least 1/2 Watt on all bands.
- Tank condenser has 7000 volt peak rating allowing rotor to be directly grounded for safety purposes.
- Standard aluminum panel 1/8" thick x 19 1/4" x 14".
- Antenna change-over relay permitting antenna to be switched from transmitter to receiver, operates from panel send-receive or remote switch.
- Adjustable link output.

### OTHER FEATURES

Separate filament transformers throughout. Built in bias supply enabling oscillator-keying as well as protection against excitation failure. Tube base clamps hold the tubes rigidly in place. Absolute symmetry of all r.f. wiring. Provisions for remote control switch. Top door on relay rack provides easy access to change 8005 plate coils.

Components are all new, standard, nationally famous: Millen, RCA, Kenyon, Bud, Par-Metal, Amphenol, B & W, Simpson, Johnson and 26 others.

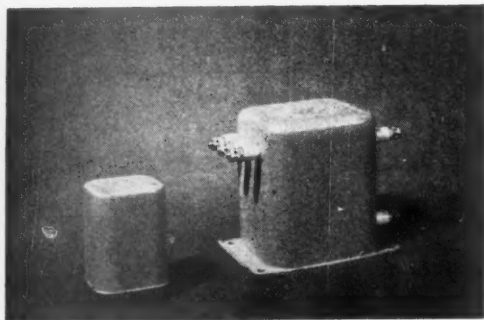
## SUN RADIO

& ELECTRONICS CO., Inc.

ESTABLISHED 1922

122-124 DUANE ST. - NEW YORK 7, N. Y. - BArlay 7-1540

## MODULATION & DRIVER TRANSFORMERS



These transformers are suitable for use with type 811, 809, TZ40, TZ20, etc. to modulate either triode or beam tube RF amplifiers. Two secondaries are provided. Impedance ratio primary to secondary number one, 2 to 1. Primary to secondary number two, 16 to 1. Will modulate up to 300 watts input. Modulation transformer, driver transformer, circuit diagrams and other information all for . . . . . \$6.90 Please include 50 cents for postage and handling. Write for latest bargain bulletin listing bargains in filter condensers, chokes, transformers, vacuum condensers, switches and many other items.

**ELECTRONIC NAVIGATION, INC.**  
Box 735, Church Street Station  
New York 8, New York

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and fulfill CAA requirements for flight operator or navigator on commercial airlines.

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way) that believes a nice broad inadequately-filtered (and illegal) tone is tops for DX because such a signal is "distinctive." You might possibly learn some day that although a broad signal sounds impressive around in W territory, it does not always deliver the goods when the going gets tough.

If it is any satisfaction to you I will state that your QRM did have nuisance value. Your signal hogged space on my HRO dial even though the xtal was set for sharp selectivity. It was surprising though how well OX3--'s T9X could be copied through your hash.

I trust that on the next occasion I will get in on the beginning of your "round-the-circle" business so that I can better understand the wrath heaped on me for failing to QRX until I receive a nod from one of the holy that I may place my call. You can be sure (almost) that I would have never, never for a moment entertained the thought of calling OX3-- if I had known you hoped to be next man in the batter's box, since after all it was merely a try for a first all-time OX QSO.

Yours for continued good sportsmanship in the mildly competitive art of DX snagging.

— Myron Lawson, W6ACI.

## 25 Years Ago

(Continued from page 57)

of C.W. Transformers," by A. H. Babcock, 6ZAF, undertakes to clear up misunderstandings about the design theory of these popular devices.

DX operations haven't suffered too greatly while we've been girding for the Transatlantics. The station of Major Lawrence Mott, 6XAD, Catalina Island, has had its c.w. signals heard by engineers of Amalgamated Wireless, Sydney, Australia.\* Traffic- and DX-wise, 1AW has relayed a message to 6ZAC, Hawaii, via 9AWM, and has received an answer over the same route in a total of four minutes and 18 seconds! Incidentally H.P.M. has now gone c.w., running 100 watts. Because amateur signals are now crossing international boundaries, Lloyd Jacquet, French 2KT, proposes a system of prefixes to avoid confusion between stations of different countries.

To lighten this issue the antics of a seagoing Sparks are recounted in "SOS — à la Wireless Willie," by Charles A. Lowry. F. B. Ostman's "A Brush with the Cops," and "A Ham What Am" are additional light fare.

West Gulf Division Manager Frank M. Corlett has been declared first-prize winner in QST's subscription contest; A. C. Koch is runner-up.

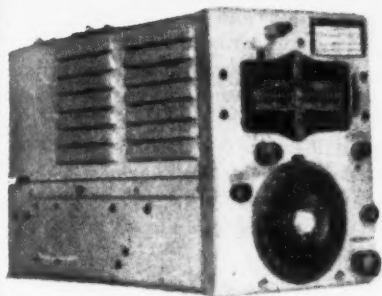
Introductions to two up-and-coming foreign amateurs are completed through "Who's Who" this month, Leon Deloy, French SAB, and W. R. Burne, British 2KW, being honored. Outstanding amateur stations described are Dr. Charles L. Klenk's 9AUU, St. Louis, Clark University's 1XZ, Worcester, Mass., N. Schaefer's 8UE, Lancaster, N. Y., and Cornelius and William Quinn's 9ZL, Neenah, Wisc.

\* Another 25-years-ago happening that we should note: 6 P.M., Eastern Australian Time, on May 15th, marked the 25th anniversary of the first reception of American amateur signals in that continent. The receiving operators, in Melbourne, were H. K. Love, VK3KU, and the late Ross A. Hull, then oa3JU, late editor of QST. The receiving gear was a t.r.f. breadboard job, the separate stages well spaced on a long table and separately tuned by extension rods to minimize hand-capacity effects. The first station heard was 6KA, Ted Nikirk of Los Angeles.



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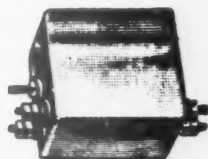
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**\$4.00** UTC 24 volt Filament transformer, for above units, also has 16, 12, 8, 4 volt taps. Spare 1625 tubes, each 75¢.

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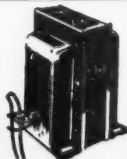
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- W1, K1 — Charles Mellen, W1FH, 320 Cornell St., Boston Mass.
- W2, K2 — Henry W. Yahnel, W2SN, Lake Ave., Helmetta, N. J.
- W3, K3 — Jesse Bieberman, W3KT, Box 34, Philadelphia, Pa.
- W4, K4 — Edward J. Collins, W4MS, 1003 E. Blount St., Pensacola, Fla.
- W5, K5 — L. W. May, jr., W5AJG, 9428 Hobart St., Dallas 18, Texas.
- W6, K6 — Horace R. Greer, W6TI, 414 Fairmount Ave., Oakland, Calif.
- W7, K7 — Frank E. Pratt, W7DXZ, 5023 S. Ferry St., Tacoma, Wash.
- W8, K8 — Fred W. Allen, W8GER, 1959 Riverside Drive, Dayton 5, Ohio.
- W9, K9 — John F. Schneider, W9CFT, 311 W. Ross Ave., Wausau, Wis.
- W0, K0 — Alva A. Smith, W0DMA, 238 East Main St., Caledonia, Minn.
- VE1 — L. J. Fader, VE1FQ, 125 Henry St., Halifax, N. S.
- VE2 — Austin A. W. Smith, VE2UW, 6164 Jeanne Mance, Montreal 8, Que.
- VE3 — W. Bert Knowles, VE3QB, Lanark, Ont.
- VE4 — Len Cuff, VE4LC, 286 Rutland St., St. James, Manitoba.
- VE5 — Fred Ward, VE5OP, 899 Connaught Ave., Moose Jaw, Sask.
- VE6 — W. R. Savage, VE6EO, 329 15th St. North, Lethbridge, Alta.
- VE7 — H. R. Hough, VE7HR, 1785 Emerson St., Victoria, B. C.
- VE8 — Yukon A. R. C., P. O. Box 268, Whitehorse, Y. T.
- KP4 — E. W. Mayer, KP4KD, P. O. Box 1061, San Juan, P. R.
- KZ6 — C.Z.A.R.A., Box 407, Balboa, Canal Zone.
- KH6 — Andy H. Fuchikami, KH6BA, 2543 Namauu Dr., Honolulu, T. H.
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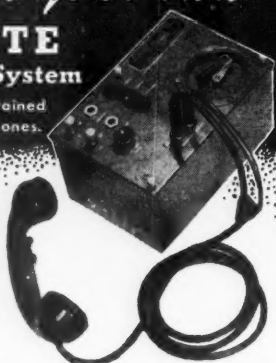
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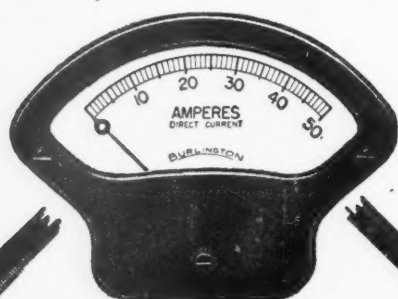


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5.0	7:00 P.M.-7:00 A.M.	10.0	440
5.0	7:00 A.M.-7:00 P.M.	10.0	400 and 4000
10.0	continuously	10.0	440 and 4000
15.0	continuously	10.0	440 and 4000
20.0	continuously	0.1	440 and 4000
25.0	continuously	0.1	440 and 4000
30.0	continuously	0.1	440
35.0	continuously	0.1	440

A 0.005-second pulse may be heard as a faint tick every second, except the 59th second of each minute. These pulses may be used for accurate time signals, and their one-second spacing provides an accurate time interval for physical measurements.

The audio frequencies are interrupted precisely on the hour and each five minutes thereafter, resuming after an interval of precisely one minute. This one-minute interval is provided to give Eastern Standard Time in telegraphic code and to afford an interval for the checking of radio-frequency measurements free from the presence of the audio frequencies. Ionospheric-disturbance warnings applicable to the North Atlantic path are given at 20 and 50 minutes past each hour. If a disturbance is in progress or is anticipated within 24 hours, the time announcement is followed by 6 Ws; if conditions are quiet or normal, the time announcement is followed by 8 Ns. The announcement of the station's services and of the station's call (WWV) is given by voice at the hour and half hour.

The accuracy of all the frequencies, radio and audio, as transmitted, is now better than a part in 50,000,000. Transmission effects in the medium may result in slight fluctuations in the audio frequencies as received at a particular place; the average frequency received, however, is as accurate as that transmitted. The time interval marked by the pulse every second is accurate to 0.000001 second. The beginnings of the periods when the audio frequencies are off are synchronized with the basic time service of the U. S. Naval Observatory.

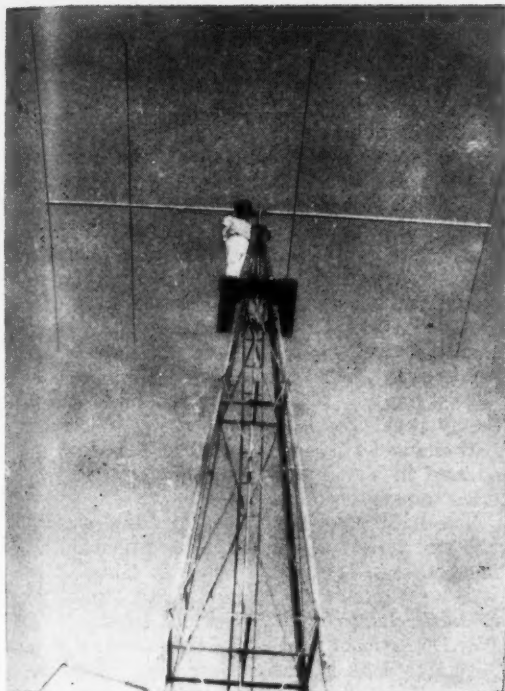
## Operating News

(Continued from page 69)

from the article "A Versatile Portable-Emergency Transmitter," published in July 1941 *QST*, the 28- and 50-Mc. units patterned after the circuit of W1HDQ's "Mobile Rig for 50 and 28 Mc." which appeared in the June 1946 issue. The Kon-Tiki versions of these transmitters employed 2E30 tubes in all stages and ran about 10 watts input. The modulator used three 2E30s. An antenna tuning unit utilizing a pi-network was used. Each of the units was built into its own watertight aluminum box with power input and output connectors made leakproof by use of

(Continued on page 144)





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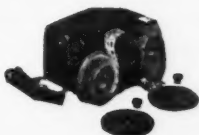
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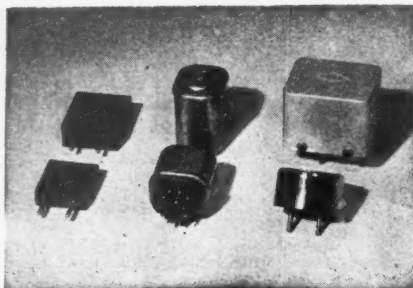
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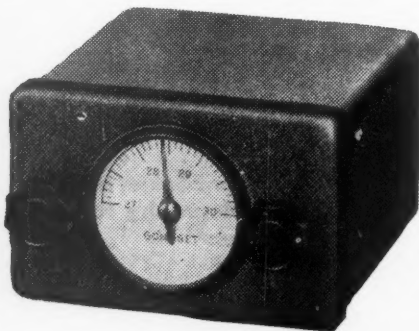
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rubber gaskets. Specifications called for omission of meters in all equipment since it was thought that they might become useless after continued use under such severe conditions. All tuning up was done by the familiar amateur procedure of using neon bulbs and lamp loops.

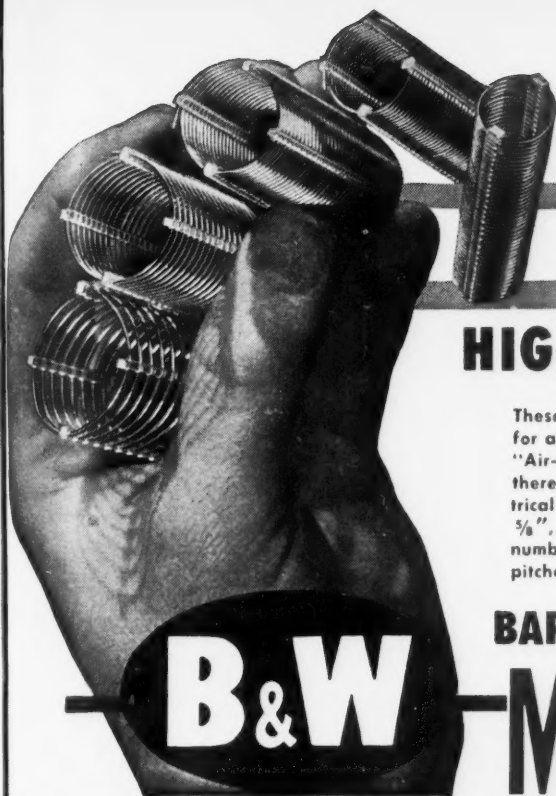
The type of power supply was much discussed beforehand. Storage batteries with a charger of some kind would probably have been a good solution. But taking a lesson from their experiences during the war, the operators decided against their use. Such batteries often broke, spilled acid and damaged vital equipment. It was regarded as a great risk to have acid anywhere near the ropes which held the nine logs of the raft together. Wind-driven generators were considered but discarded as being too large. It was finally decided that the power supply be dry batteries and hand generators. The batteries were encased in a box similar to that used for the other transmitter units.

The main receiver chosen for LI2B was an NC-173. Other equipment carried included a hand-cranked emergency set of the Gibson Girl type for 500 and 8280 kc., a special v.h.f. set for contacting aircraft, both provided by the U. S. War Department, and two of the famous British 3-16 Mc. Mark II transmitters (dropped by the hundreds in all occupied countries during the war). After early trials of various antennas, including balloon- and kite-supported types, the antenna chosen for all operation was an end-fed wire supported at the far end by the raft's 40-foot mast.

For the first twenty-two days following departure from Callao, Kon-Tiki's only radio contact was with OBE, station of the Peruvian Naval School. WHD, the *New York Times* station, had warned the expedition beforehand about a dead spot off the coast of Peru. The operators later agreed that such a dead spot does exist. LI2B called its amateur key stations according to plan on specified frequencies during this early period but without success. Then on May 20th at 9:44 p.m. PST, Harold Kempel, W6EVM, heard and worked the raft on 14,142 kc., providing the first North American contact. By mid-June LI2B had worked numerous amateur stations including W1CWX, W1DQH, W3YA, W5FNA, W6AOA, W6CIS, W6EVM, W6ICP, W7GXA, W8PCS, W8UJ, W9TB, W9UKO, VE3ACL, VE3OZA, KH6DD, OA4AE, ZL4DD on 14 Mc. and W4KXV, W6GAL, KZ5AW, KZ5AZ, KZ5ND on 28 Mc. For work with 28-Mc. stations Kon-Tiki, by special authorization, used the frequency 27,980 kc. to avoid the possibility of QRM.

As the weeks rolled by a smoothly-working long-haul network of amateur stations developed. Stations in North America, Canal Zone and Norway coöperated in handling the flow of information from the raft. On the West Coast W6EVM and W6AOA were the mainstays. EVM kept nightly schedules with LI2B and W3FNG, Washington, D. C., on 14 Mc., relayed

(Continued on page 148)



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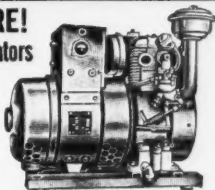
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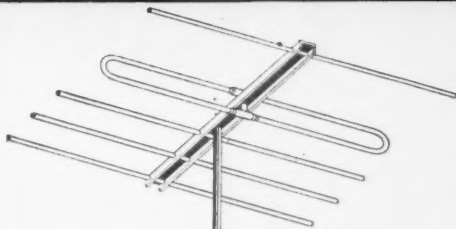
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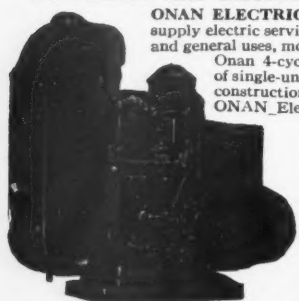
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messages to and from the Norwegian Embassy and transmitted meteorological data to the U. S. Weather Bureau. On at least two occasions urgent traffic was exchanged between the Embassy and the raft via this circuit. In one instance a message was relayed from the raft to W3FNG, delivered by telephone to the Embassy, an answer procured and relayed in the reverse direction to Kon-Tiki—all in a matter of thirty-five minutes elapsed time!

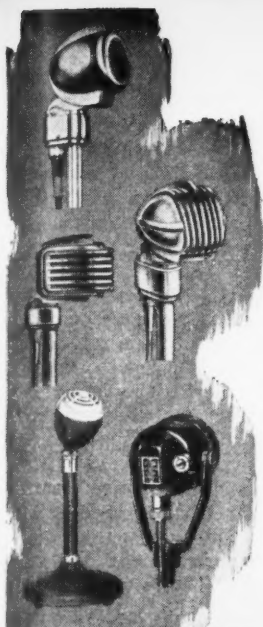
Another reliable circuit from LI2B to Washington was provided by W3YA, State College, Pa. Students and faculty members kept the college station in regular direct touch with the expedition. Schedules were maintained nightly to expedite delivery of traffic. W3YA also assisted in relaying information from LI2B to Norway, in some cases direct to LA1C, at other times via schedules with W1AW and other stations.

The expedition personnel were of course anxious to keep in touch with Norway. Prior arrangements had been made to have LA1C, headquarters station of the Norwegian Radio Relay League, serve as end link in a relay route. W6AOA became the very important link from LI2B. He relayed reports during the first several weeks to W1CWX, who in turn passed them on to LA1C via direct schedule. When other factors interfered with his schedules CWX turned the job over to various other stations. Among those who assisted in this manner were W1AW, W1DX, W1LYL, W3GAU, W3YA, W4KXV, KZ5AW, KZ5AZ, KZ5ND, LA3GA.

One of the highlights of the voyage was a contact between LI2B and LA7Y on August 5th. The Kon-Tiki operators radioed this statement about the event: "It was a great day for us. While in contact with W6EVM, he told us that LA7Y, whom he had just contacted, had heard LI2B. After completing schedule with W6EVM, LI2B called LA7Y and contact was established with RST 559 reports both ways. This happened at 0630 GCT when Kon-Tiki had the position South 15 degrees 50 minutes and West 141 degrees 25 minutes. The distance would be about 10,000 English miles." Subsequently LA7Y was worked several times and messages exchanged.

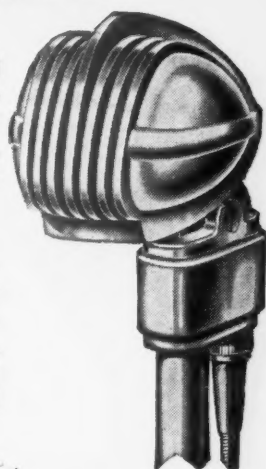
In spite of careful advance planning to reduce technical troubles, the LI2B operators had difficulty with certain elements of their equipment. The supply of dry batteries arrived in Peru so late that there was no opportunity to pack them in watertight cases. Heavy seas were encountered during the first few days and part of the heater battery reserve was damaged by exposure to water. Humidity was also so great that the capacity of the cells fell considerably even when not in use. After two months at sea all heater batteries were down to 4 volts. Fortunately the plate batteries with their light drain were holding up well. Resourcefully, the operators disassembled some of the latter, rewired the cells in parallel and thus provided heater supplies of adequate capacity to keep LI2B on the air.





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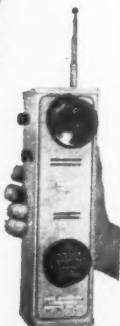
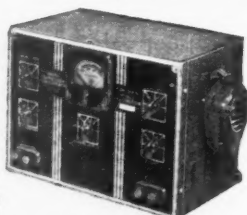
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During the last month of the voyage much time was spent repairing batteries as the supply dwindled. After being used one month the crystal of the 14-Mc. transmitter was fractured. New crystals were installed but also became defective. The only alternative left was to tune the ten-meter rig to 14 Mc., the resulting frequency forcing LI2B to 13,990 kc. These equipment difficulties were not more serious than to keep LI2B off the air four days.

The mission of Kon-Tiki was successfully completed August 7th, 101 days after departure from Peru, when waves deposited the raft on a reef off Raiora Island. But the safety of the courageous crew which had made the venture a success was still at stake. Half an hour after being stranded LI2B was fortunate in making contact with ZK1AB on Raratonga, who was asked to stand a listening watch and communicate with the Norwegian Embassy at Washington if LI2B was not heard at the end of a 36-hour period. Just before the specified period ended, contact was established with W0MNU and word of the landing passed along, thus avoiding the necessity of sending out any rescue parties.

After being taken off the reef by natives, the Kon-Tiki crew set up their radio gear ashore and were on the air for five days. Again from a little village at Raro the station was active for five days. French authorities allowed LI2B to open up once more aboard the government ship *Tamara* which took the men to Tahiti where the station was operated ashore and made its final contact with amateurs. The expedition crew then returned to the United States by ship.

In addition to those already mentioned, other amateurs assisted in various ways. W3AMS, W3JDQ and W3ECP aided W3FNG in handling schedules with W6EVM. W3ECP was instrumental in making advance arrangements for contact with Washington. W6CIS, W6RBQ and W6WB assisted in covering LI2B transmissions.

Amateur radio can be justifiably proud of its record in providing service for which the Kon-Tiki crew, the agencies served and the Norwegian Radio Relay League have expressed their unqualified praise and gratitude. Hearty congratulations to all who took part.

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# Index to Volume XXXI—1947

## ANTENNAS — GENERAL

Antenna for 7-Mc. DX, An (Schellenbach).....	32, June
Balloon Antenna Rides Again, The (Bonadio)...	60, Mar.
Horizontal vs. Vertical — 80 Meters.....	43, Aug.
One-Man Skyhook, A (Lewis).....	19, July
Sturdy 55-Ft. Skyhook, A (Gardner).....	28, Oct.

## ANTENNAS—ROTARY BEAMS

All-Metal Array for 6 and 10, An (Tilton).....	52, July
Antenna That Multiplies by 50, An (Kmosko)...	50, Sept.
Bamboo Poles for Beam Elements (Shannon)...	24, Nov.
Building Your Own Beam Rotator (Klar)...	26, Nov.
Doghouse in the Sky (Marcellus).....	63, Oct.
Element Spacing in 3-Element Beams (Erhorn)	37, Oct.
Fundamental Beam Patterns (Cleckner).....	23, Mar.
Gain vs. Element Spacing in Parasitic Arrays (Rowe).....	30, Apr.
"Halo" for Six Meters, A (Stites).....	24, Oct.
Hydraulic Antenna Rotator, A (Lotter).....	36, Sept.
Lightweight Boom Construction for 28-Mc. Beams (Anderson).....	24, Nov.
Multielement Radiators in Close-Spaced Arrays (Carmichael).....	24, June
New Approach to Direction Indicators (H & K)	43, Dec.
Novel Ten-Meter Beam, A (Handel).....	59, May
Position Indicator for Directional Arrays, A (Tomczak).....	61, Aug.
Projection-Type Beam Direction Indicator, A (Brawley).....	27, Nov.
Put That Beam Up to Stay (Heidt).....	28, Nov.
Rugged Wall Bearing, A (H & K).....	63, June
Simple Rotatable Antenna for Two Bands, A (Long).....	22, Jan.
Stacked Array for 6 and 10, A (Tilton).....	38, Feb.
V.H.F. Antennas — Horizontal or Vertical?....	35, Jan.
4-Element 14-Mc. Beam, A (Van Brunt).....	22, Nov.
40-Pound 14-Mc. Four-Element Beam, A (Nose)	35, Dec.

## ANTENNAS — TRANSMISSION LINES

Center Joint for 300-Ohm Doublet (H & K)....	74, Feb.
Choosing a Transmission Line (Purinton).....	39, June
Coupling to Flat Lines (Goodman).....	26, Aug.
Cutting Matching Stub (H & K).....	62, Apr.
Do It Inductively (Taich).....	58, Sept.
Flat Lines and Loading.....	34, Jan.
Matching the Line to the Ground-Plane Antenna (McWatters).....	56, May
"Micromatch," The (Jones, Sontheimer)	15, Apr.; 45, July
Standing Wave Indicators (H & K).....	60, Jan.
Standing-Wave Meter for Coaxial Lines, A (Pattison, Morris, Smith).....	41, July
Tuned-Line Matching Transformer, A (Gadwa)	36, Jan.
"Twin-Lamp," The (Wright).....	22, Oct.
Useful Feeder Support (H & K).....	49, Dec.
Versatile Antenna Coupler (H & K).....	62, Oct.

## AUDIO FREQUENCY EQUIPMENT AND DESIGN

(See also, "Frequency Modulation")	
Audio Filters for the Speech Amplifier (Galin)...	17, Nov.
Direct-Reading Modulation Meter, A (Atchley, Fricks).....	55, Feb.; 64, Mar.
House Cleaning the Low-Frequency 'Phone Bands (Grammer).....	24, May
More on Speech Clipping (Smith).....	18, Mar.
Overmodulation Splatter Suppression (Villard)	13, June
Second-Harmonic Filter for 75-Meter 'Phone Transmitters (H & K).....	55, July
Simple Volume Compressor, A (Diets).....	43, Oct.
Versatile 'Phone Monitor (H & K).....	55, July
120-Watt Modulator and Speech Amplifier, A (Chambers).....	13, Aug.

15-Watt Modulator for Low-Power Work, A (Geyer).....	28, Jan.
40-Watt Modulator with Cathode-Coupled Driver, A (Lattin).....	42, Apr.; 12, June

## BROADCAST INTERFERENCE

Curing Interference to Television Reception (Seybold).....	19, Aug.
Inexpensive BCI Cure (H & K).....	61, Mar.
Interference with Television Broadcasting (Grammer).....	24, Sept.
More on BCI.....	61, Mar.
Multiple Wavetraps to Cure BCI (H & K)....	65, Nov.
New BCI Circulars.....	74, May
Proposed Changes, 42-88 Mc.....	32, Oct.
Television Interference.....	33, Aug.
TVI (Editorial).....	11, Nov.
V.H.F. B.C.I. (Editorial).....	11, June

## COMMUNICATIONS DEPARTMENT

A-1 Operator Club.....	70, Jan.; 76, June; 66, Dec.
Chess by Radio.....	66, Jan.; 64, Aug.
Code Practice on 28 Mc.....	65, Jan.; 78, Feb.; 81, Sept.
Directory of Active Nets.....	82, Feb.; 74, Apr.; 78, Nov.
Frequency-Measuring Tests.....	65, Jan.; 80, May; 81, Sept.
Meet the SCMs.....	W7IWU, 67, Jan.; W1HRC, 83, Feb.; W8PNQ, 72, Apr.; W4FLS, 76, May; VE7WS, 77, June; W5HX1, 66, July; W8SCW, 68, Aug.; W8JW, 82, Sept.; W1AZW, 69, Oct.; W6GC, 80, Nov.; W6GZD, 67, Dec.
Message Pushers Club.....	79, Sept.
New ARRL Section — Yukon.....	83, Feb.
Official Experimental Stations.....	66, July
Official Broadcast Stations.....	79, May
Passing the Gavel.....	77, Nov.
Roll of Operating Interests.....	64, Jan.; 71, June
SCM Elections.....	83, Feb.; 72, Apr.; 77, June; 69, Aug.; 73, Oct.; 68, Dec.
Training Aids.....	68, Mar.; 77, May; 73, June; 68, Aug.; 82, Sept.; 71, Oct.; 80, Nov.
YLs — and Where to Find Them.....	79, Feb.

## CONTESTS AND OPERATING ACTIVITIES

CD Parties.....	66, Jan.; 74, Apr.; 65, July; 70, Oct.
Field Day, 1946.....	45, Feb.
Field Day, 1947.....	33, June; 78, Sept.
Fifth Annual ARRL-Member Party.....	49, Jan.; 68, Apr.; 44, July
Get-Acquainted Party, 1946.....	76, May
International DX Competition.....	16, Jan.; 52, May; 56, June; 54, Nov.
Navy Day Receiving Competition, 1947.....	52, Oct.
Navy Day — 1946.....	34, Mar.
New DXCC Award.....	69, Mar.; 64, July; 69, Oct.; 79, Nov.
Postwar Countries List.....	49, Feb.; 64, July
Sweepstakes, 1946.....	81, Feb.; 51, June
Sweepstakes, 1947.....	47, Oct.
VE-W Contest.....	58, Apr.; 65, Aug.
V.H.F. Marathon.....	41, Jan.
V.H.F. Relay and QSO Party.....	70, May; 68, Dec.
WAS Award.....	68, July
West Palm Beach Radio Club Int'l. V.H.F. Trophy.....	67, Aug.
WPR Certificate.....	66, Apr.
YL WAS.....	79, Feb.; 65, Dec.

## CONVENTIONS

Delta-West Gulf Divisions.....	42, Aug.; 146, Oct.
Hudson Division.....	46, Sept.
Massachusetts State.....	59, June
Midwest Division.....	23, May
New England Division.....	12, Oct.

New Hampshire State.....	12, Oct.
Southeastern Division.....	26, June
Southwestern Division.....	12, Oct.

## EDITORIALS

Accomplishments Old and New.....	9, Jan.
Breather.....	13, Feb.
Come Eleven.....	11, May
Change.....	11, Sept.
Ho for 420 Mc.....	11, May
Long Faces.....	11, Oct.
Nippers.....	11, July
Public Relations Consciousness.....	11, Aug.
Reserve Drills.....	12, Oct.
Should We Have a Class D License?.....	11, Mar.
Sick Signals.....	11, May
Substitution of Components.....	11, Sept.
TVI.....	11, Nov.
V.H.F. BCI.....	11, June
Wanted: A Second Spectrum.....	11, Dec.
Welcome Hand, A.....	11, July
World Conference, The.....	13, Apr.
You & Who Else?.....	14, Feb.

## EMERGENCIES AND EXPEDITIONS

AAU Marathon.....	78, Feb.
Amateur Radio Aids Rescue of Snowbound Motorists.....	70, Jan.
Amateur Radio Helps To Save a Life.....	72, Oct.
Atlanta Hotel Fire.....	66, Mar.
Emergency at 50 Below.....	70, Apr.
Florida Hurricane Emergency.....	69, Jan.
Florida Storm Emergency.....	65, Dec.
Illinois Emergency.....	66, Apr.; 74, June
Iowa Storms.....	66, Apr.; 68, July; 79, Sept.
Kon-Tiki Expedition.....	71, Mar.; 68, Apr.; 67, Aug.; 69, Dec.
MacMillan Arctic Expedition.....	66, Aug.
Maine Emergency.....	69, July
Michigan Flood.....	72, June
Mississippi River Flood Emergency.....	67, Dec.
Nebraska Floods.....	83, Sept.
Norfolk Hams Ready.....	80, Sept.
Palmyra Island Emergency.....	67, July
Quebec Amateurs and Ice Floe Rescue.....	70, Mar.
River Data Flow via Amateur Radio.....	66, Aug.
Ronne Antarctic Research Expedition.....	71, Mar.
Texas City Explosions (McKean).....	34, July
Texas-Oklahoma Tornado (McKean).....	34, July
Vermont Flood Emergency.....	72, Oct.
Winds, Waves and Snakes (Hayes).....	40, Dec.
235 Mc. Used at Boat Races.....	69, Jan.

## FEATURES AND FICTION

Amateurs and the United Nations.....	46, June
Come Aboard, OM! (Wicks).....	44, Oct.
How To Cook a Ham (Stong).....	64, Mar.
"I Just Put Up Another Antenna" (Lippman).....	66, Feb.
"Listen, Oscar . . ." (Jessup).....	47, Nov.
Meteor Detection by Amateur Radio (Villard).....	13, July
Painless Reconversion (Cunningham).....	56, Sept.
Paradise Regained (Goodman).....	56, Dec.
Phone-Band Phunnies	
Little Sir Echo.....	60, Aug.
Proud Papa.....	57, Sept.
Coy Cuthbert.....	65, Oct.
The Bucolic Boy.....	72, Nov.
The Reluctant 'Phone Man.....	57, Dec.
Relax, Men! Use Haywire (Williams).....	68, May
Repenter, The (Zimet).....	57, Jan.
Staggering Band Theorem (Rapp).....	60, Apr.

## FOREIGN NEWS

Amateurs and the United Nations.....	46, June
Argentina.....	53, Mar.
Austria.....	144, May
China.....	45, Dec.
Czechoslovakia.....	48, Jan.; 45, June; 45, Dec.
December Calendar.....	57, Apr.
Denmark.....	110, July
Eire.....	48, July
Finland.....	45, June; 48, July

France.....	51, Aug.
Germany.....	45, June
Great Britain.....	53, Mar.; 48, July; 45, Dec.
Guatemala.....	45, Dec.
Hungary.....	48, Jan.
Iceland.....	132, Sept.
Japan.....	45, June; 110, July; 51, Aug.; 136, Sept.; 53, Oct.
June Calendar.....	51, Aug.
Korea.....	132, Sept.
Luxemburg.....	45, June
Netherlands Indies.....	45, June; 45, Dec.
New Zealand.....	69, May
Panama.....	118, Dec.
Population Summary.....	53, Mar.
QSL Bureaus.....	48, Jan.; 33, Mar.; 69, May; 116, Aug.; 53, Oct.
Rumania.....	48, Jan.
South Africa.....	138, Sept.
WIA International DX Contest.....	63, Sept.

## FREQUENCY MODULATION

Better N.F.M. Reception with A.M. Receivers (Harrington, Bartell).....	38, Nov.
F.M. on Two Meters (Geist).....	48, June
Low-Frequency N.F.M. (Goodman).....	21, July
L.F.-N.F.M.....	28, Feb.
N.F.M. Reception.....	30, Mar.; 45, Aug.
N.B.F.M. for Voice Communication (Bishop).....	20, May
New Phase-Modulation Circuit for N.B.F.M. Transmission, A (Babkes).....	11, Jan.

## HAPPENINGS OF THE MONTH

Beadle Retires.....	47, Sept.
Board Matters.....	45, Apr.
Board Meeting, Special.....	41, May
Board Meeting, Annual.....	27, June
CAA Alaskan Openings.....	47, Sept.
Canadian Elections.....	49, Apr.
C.A.R.L. Show.....	32, Oct.
Chief Engineer Sterling.....	47, May
Circulation Matters.....	28, July
Election Notice.....	32, Aug.; 47, Sept.
Election Results.....	29, Jan.; 42, Nov.
Engineers, Technicians Wanted.....	43, Nov.
Executive Committee Meetings.....	112, Aug.
FCC Notes.....	39, Dec.
Membership Duas.....	28, July
New FCC Amateur Division.....	32, Oct.
Overseas Opportunities.....	36, Feb.
Resignation of Baker.....	42, Mar.
Staff Notes.....	42, Mar.; 47, May
Television Interference.....	33, Aug.
Wanted — Radiomen for Overseas.....	49, Sept.
W Portables in Canada.....	114, Aug.
W8WV Decorated by China.....	47, May

## KEYING AND CONTROL CIRCUITS

Basic Principles of Self-Synchronous Repeaters (Gossland).....	50, May
Clean-Cut Break-In Keying (Burnett).....	27, Mar.
Combination Bias Supply and Station Control System (H & K).....	64, Nov.
Electronic Multicircuit Breaker, An (Hanchett).....	34, Aug.
Keying the Tetrode Amplifier (Ballou).....	46, Dec.
Quiet Break-In System, A (Robinson).....	33, Feb.
Untuned Keying Monitor (H & K).....	61, Mar.
Versatile Control Systems for Transmitters (Kanyo).....	58, Oct.

## MEASUREMENTS AND TEST EQUIPMENT

Alignment Aid for V.H.F. (H & K).....	59, Aug.
Another Use for the Crystal Wavemeter (H & K).....	62, Oct.
Balancing Phase-Inverter Circuits (H & K).....	59, Aug.
Band-Edge Markers for V.H.F. (H & K).....	62, Apr.
C. W. Transmitter Monitoring (Goodman).....	34, May
Direct-Reading Modulation Meter (Atchley, Fricks).....	55, Feb.
Extending the Range of the CRL Bridge (H & K).....	60, Jan.
Finding the Inductance of R.F. Coils (Crotinger).....	54, Mar.
Grid-Dip Oscillator (H & K).....	58, Aug.



How Sensitive Is Your Receiver? (Goodman)...	13, Sept.
"Micromatch," The (Jones, Sontheimer)...	15, Apr.; 45, July
Neon-Bulb Protector (H & K).....	59, Aug.
New WWV Schedules.....	14, Apr.; 154, June; 142, Oct.; 142, Dec.
Standing-Wave Meter for Coaxial Lines, A (Pattison, Morris, Smith).....	41, July
Transitron Utility Oscillator, A (H & K).....	74, Feb.
"Twin-Lamp," The (Wright).....	22, Oct.
Universal Transmission Bridge, A (Tiffany).....	54, Dec.

## MISCELLANEOUS

### Book Reviews

Basic Mathematics for Radio Students (Colebrook).....	152, Feb.
Highways in the Sky (Shores).....	108, Oct.
Understanding Microwaves (Young).....	100, Jan.
Shorthand Circuit Symbols.....	46, Aug.
Simple <i>L</i> & <i>C</i> Calculations (Najork).....	31, Sept.
U. S. Naval Reserve.....	21, Nov.; 50, Dec.
World-Time Slide Rule, A (Christian).....	47, Jan.

## OPERATING PRACTICES

(See also Operating News and Correspondence Section of each issue)

DX Operating.....	51, Feb.
Ending Signals.....	67, Apr.
Golden Rule, The.....	68, Oct.
'Phone-Band Phunnies.....	60, Aug.; 57, Sept.; 65, Oct.; 72, Nov.; 57, Dec.
"'Phone Spoutin'" (Sourdough).....	66, June
Power Increases and Their Effects (Smith).....	55, Jan.
Rotten 'Phones (Marks).....	48, Mar.

## POWER SUPPLY

Getting the Most Out of Your Mobile Power Supply (H & K).....	144, Oct.
Obtaining Higher Voltage from Dual Voltage Transformers (H & K).....	48, Dec.
Power Supply for the SCR-211 Frequency Meter (H & K).....	72, May
Selenium Rectifier Hints (H & K).....	58, Aug.
Selenium Rectifiers as a Bias Source (H & K).....	62, Apr.
Two-Wire Connection for Bias Pack (H & K).....	60, Jan.
Using Selenium Rectifiers (Berkman, Knochel).....	50, Oct.

## PROPAGATION

Bonus for 28-Mc. Observers.....	32, Mar.
Fundamental Beam Patterns (Cleckner).....	23, Mar.
Horizontal vs. Vertical — 80 Meters.....	43, Aug.
How High Is an Inversion?.....	27, Dec.
"Maybe It's Just Conditions".....	30, Feb.
Meteor Detection by Amateur Radio (Villard).....	13, July
Predicting Amateur "Conditions" (Atwood).....	21, Apr.
Sunspots and V.H.F. Radio Transmission (Norton).....	13, Dec.
V.H.F. Antennas — Horizontal or Vertical?.....	35, Jan.
21 Mc. — An Appraisal.....	26, Dec.

## RECEIVING

Adapting the Car Radio to a Converter (Barbee).....	60, June
Cathode-Coupled Converters for Surplus Receivers (Bender).....	37, Aug.
Combination B.F.O. and A.N.L. for the Sky Buddy (H & K).....	62, Apr.
Eliminating Car Noise in 28-Mc. Mobile Reception (Price).....	37, May
Exit Heterodyne QRM (McLaughlin).....	13, Oct.
How Sensitive Is Your Receiver? (Goodman).....	13, Sept.
Modernizing the Old Receiver (North).....	54, Apr.
New Noise-Reducing System for C.W. Reception (Hings).....	21, June
"Q5-er," The (Rand).....	18, Dec.
S-Meters — So What?.....	29, Feb.
Surplus Conversion	
Calibrating the BC-348 (Prescott).....	69, Nov.
Converting the BC-348-Q (Kersten).....	19, Jan.

Curing Noise-Limiter Troubles in the BC-348-C (Parcel).....	71, Nov.
Further Note on the BC-348-Q (Kersten).....	71, Nov.
Modifying the BC-348-Q (Bernard).....	66, Nov.
Servicing Crystal Filters in the BC-348 (H & K).....	59, Aug.
Triode Mixer vs. Pentode Amplifier (Tannenbaum).....	30, Nov.
"Why Don't They Build Better Receivers?".....	31, June

## RECEIVERS

Building a Code-Practice Receiver (Smith).....	28, Dec.
Dialless Converter, The (Creutz, McAvoy).....	34, June
Looking Over the Postwar Receivers	
Collins 75-A.....	54, Sept.
Hallcrafters SX-42.....	48, May
National NC-173.....	46, July
Old Stand-By, The (Knipe).....	42, Feb.

## REGULATIONS

Amateur Stations on Army Posts.....	68, Jan.
Atlantic City Conference	
Atlantic City — 1947 (Budlong).....	36, Apr.; 29, May
Breather (Editorial).....	13, Feb.
Commission Reassures Amateurs Regarding Frequencies.....	46, May
Concluding Weeks, The.....	32, Nov.
Conference Notes.....	41, May; 28, June; 39, Dec.
Conference Preparations.....	41, Mar.; 45, Apr.
First Two Weeks, The.....	29, July
Long Faces (Editorial).....	11, Oct.
Review of July.....	32, Sept.
Review of August.....	17, Oct.
U. S. Amateur Proposals.....	47, Apr.
World Conference, The (Editorial).....	13, Apr.
Canada Widens 400 Mc.....	100, July
Changes in Canadian Regulations.....	33, Aug.
Counterpart Calls.....	30, Jan.
FCC Amateur Examinations for 1947.....	30, Jan.
FCC District Changes.....	37, Feb.
K Calls.....	36, Feb.
KZ5 Civilian Amateurs.....	49, Apr.
More License Extensions.....	30, Jan.; 41, Mar.
More Restrictions Removed.....	29, June
Moscow (Budlong).....	25, Jan.
N.B.F.M. Authorized.....	48, Sept.
New License Card Forms.....	42, Nov.
Our Old 2½-Meter Band.....	31, Jan.
Proof of Use Again Waived.....	36, Feb.
Proposed Changes, 42-88 Mc.....	32, Oct.
Regulatory Matters.....	47, Sept.
S-Band Diathermy.....	37, Feb.
Special Temporary Authority.....	32, Oct.
Traffic With Japan.....	36, Feb.
11-Meter Band Changed.....	29, June
400-Mc. Band Widened.....	33, Aug.
80 Opened in Hawaii.....	30, Jan.; 42, Mar.

## TRANSMITTING

C. W. Transmitter Monitoring (Goodman).....	34, May
Coupling the VFO to the Crystal Stage (Hunter).....	32, July
Device for Breaking Arcs in Transmitters (H & K).....	62, Oct.
Home-Built Multiple Crystal Holder (H & K).....	72, May
Inexpensive Crystal Substitute (Harrison).....	56, July
Power Increases and Their Effects (Smith).....	55, Jan.
Pretuned Bandpass Frequency Multiplier, A... (Silver).....	29, Oct.
Spurious Transmitter Radiations (Conklin).....	66, May
Surplus Conversion	
BC-221 Frequency Meter as a VFO, The (Johnson).....	43, Mar.
Operating the BC-645 on 420 Mc. (Ralph, Wood).....	15, Feb.
Revamping the 150-B for 14-Mc. Operation (Murray).....	22, Sept.
Three-Way Crystal Socket (H & K).....	75, Feb.
Useful Formula for Solenoid Inductor Design (Ricks).....	71, May
Variable End-Linked Coils (H & K).....	64, Nov.

## TRANSMITTERS

"Barracks Bag VFO," The (Nichols).....	54, June
Inexpensive Rig for Local Duplex Operation, An (Ralston).....	52, Aug.
"Last-Ditcher," The (Paddon).....	24, Aug.
Medium Power — Living-Room Style (Wagoner).....	37, Sept.
Stabilized 813 Amplifier, A (Smith).....	23, Feb.
Table-Top Kilowatt, A (Grammer, Mix, Goodman).....	13, May
2, 6 and 10 with Crystal Control (Millen).....	66, Sept.

## V.H.F. AND MICROWAVES

Band-Edge Markers for V.H.F. (H & K).....	62, Apr.
---	----------

Compact and Inexpensive Superhet for 144 Mc., A (Barbee).....	33, Oct.
Dishing Out the Milliwatts on 10 KMc. (McGregor).....	58, Feb.
Four-Twenty Is Fun (Tilton).....	13, Nov.
Improved Receiver for Two Meters, A (Hadlock).....	35, Mar.
Let's Start Right on 1 1/4 (Hadlock).....	22, Dec.
Low-Cost Six-Meter 'Phone (Chambers).....	13, Mar.
Low-Cost 2-Meter Transmitter (Tilton).....	26, Apr.
Operating the BC-645 on 420 Mc. (Ralph, Wood).....	15, Feb.
Put 'Em Push Push (Frenkel).....	39, Jan.
Practical Crystal Control for 144-Mc. Mobile Work (Hertzler).....	54, Oct.
V.H.F. Crystal Oscillators.....	44, Nov.
2400-Mc. Oscillator Cavity, A.....	65, Oct.



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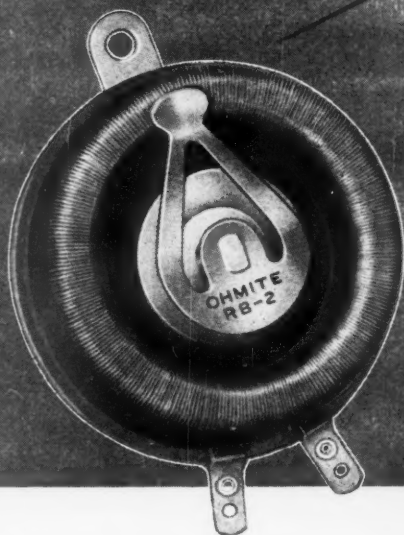
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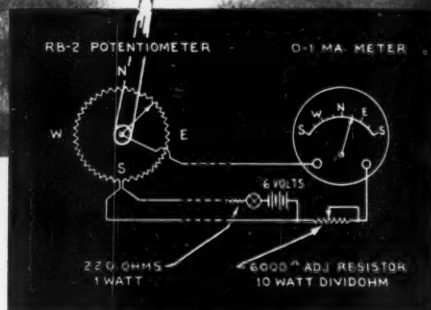


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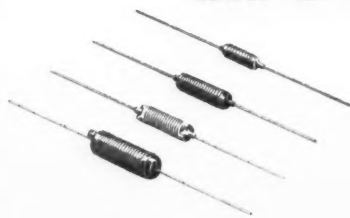
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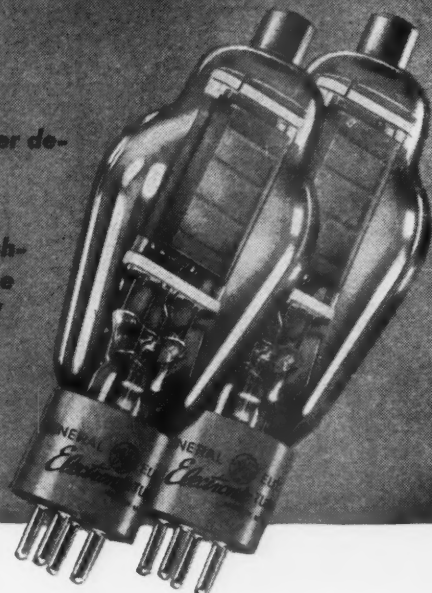


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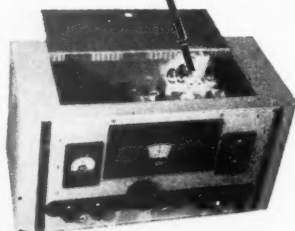
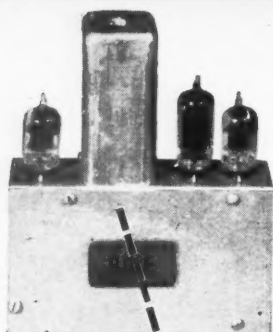
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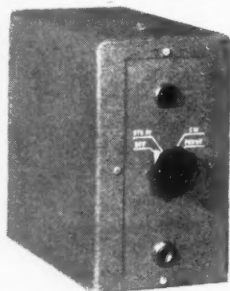
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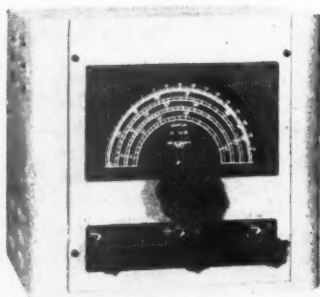


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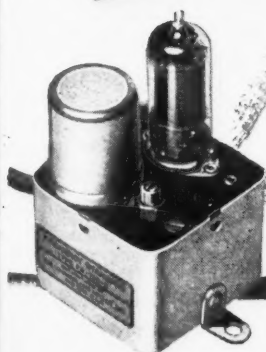
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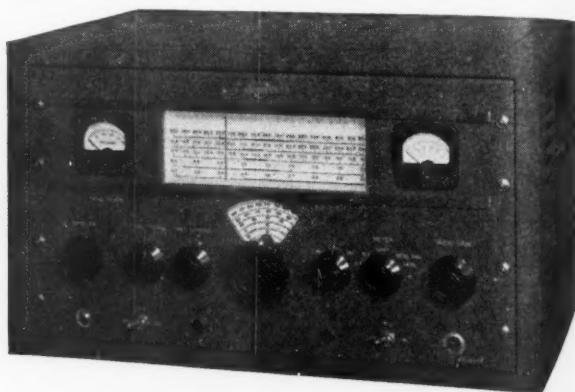
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**OSL-SWLs.** As always the best deal. Free samples. Deluxe 104. Meade, W0KXL, 1507 Central Ave., Kansas City, Kans.

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**FOR Sale:** ART 13 transmitter with tubes \$50.00. Pay \$1 for October '39 OST, W4KLL.

**FOR Sale,** LF900 converter and Hallcrafters S39 receiver. Wanted, early wireless equipment, and literature prior to 1925. Franklin Wingard, Rock Island, Illinois.

**SELL HRO STA1,** power supply, speaker \$200. Excellent condition. WICCA, 609 Birch, Fall River, Mass.

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**GET a converted BC8%** \$ nine-tube superhet for each band, 10 to 80 meters. Bandsread, tuned rf, two if, bfo, two gas limiters, 110v ac. R25. Specify band. Electronmachine Co, 2 East End Ave., N. Y., N. Y.

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**TRANSMITTER:** Keys: New, beautifully built, high quality Mac type 200 keys. Black crackle finish, heavy cast oval shape base, the type that doesn't require fastening down, it won't tilt. Switch lever for closing circuit. All parts chromium plated. Adjustable bearings, heavy 3/16" silver contacts. A real buy. \$1.00. Shipping wt., 1 lb. Please include postage. Ed. Doherr W3CIR/1, 96 Highland St., Hyde Park, Boston, Mass.

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**14 Volt Willard Aircraft Battery,** new, dry, and G. M. 28 volt ampere generator, also new. Both for \$45.00. Guy Black, W9AGJ, 12 Lambert Road, Belmont, Mass.

**FOR Sale — Abbott TR-4A (955 Det.)** complete with 300 volt power supply mic. with 300v 100 ml. Carter Genemotor. Relay, Cables and Control Box and Whip Ant. for Mobile or fixed operation. All new condition. \$50.00 complete. W2KBJ M.M. Goetz, 2720 Grand Concourse, N. Y. 58, N. Y.

**SELL, NC-200, HRO, FB7,** Millen VFO, Exciter, Bliley Vari-x, KW Final 810's B & W coils cond., B & C supplies, misc. tubes and colla. W3OP Blue Bell, Penna.

**EIGHT tube superhet complete \$25.** Instructograph \$15. W2WDM 36 Baldwin Avenue, Newark, N. J.

**WANTED.** Top and cabinet for R. F. Section for BC610 or HT-4 Transmitter. Gordon Nordstrom, W0ICQ, 1520-5th Street N. W., Cedar Rapids, Iowa.

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**RG-29/U coax,** 2 1/4¢, per foot; RG-39/U, 3 1/4¢ postpaid. While it lasts. Harry H. Van Dick, Little Falls, N. J.

**FOCUS beam antenna.** All aluminum. Improved intermediate spacing. Choice of matching systems. Houskeeper, 956 Paulding St., Peekskill, N. Y.

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**BEAM antenna (3 element)** for 10-11 meters. Light weight, telescopic elements, complete parts ready to assemble. Only \$19.75. Write for latest Bargain Bulletin. Gifford-Brown, Inc., Cedar Rapids 1, Iowa.

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**SELL 60-watt fone xmitter,** cabinet rack, ECO. R. N. Johnson, 394 Main Street, Portland, Conn. Tel. Middletown 773-J.

**SELL:** Globe Trotter, 10-40 meter coils, tubes no xtals. WAS on 40. \$85 plus shipping. Abbott, DK3, tubes, \$17.50. W4MEA, 1444 Caroline Ave., Kingsport, Tenn.

**BC-312.** Used, no tubes, with manual — \$20. Larky, 223 West Summit, Somerville, N. J.

**NATIONAL NC-240-D rcvr** and speaker, complete, \$175. C. Horn, 325 East 163rd St., New York 56, N. Y.

**SELL RME-45** with Calomatic tuning, excellent condx, best offer over \$100 takes it. Anthony Paulina, W2SJM, RD #3, Box 8M New Brunswick, N. J.

**SELL:** Cleveland, Ohio vicinity: Meissner 150-B xmitter, converted for 20 meters, coils, tubes, T-26 microphone, spare parts, \$275. C. Alvin Draper, 1272 Andrews Ave., Lakewood, Ohio. Phone Independence 8471.

**MUST sell:** 100-watt fone xmitter, \$75; BC-348 rcvr and spkr, 110 volts AC, \$45. Large refriger. compressor \$25. Three unpunched BC-610 chassis, 15" x 30" x 3", \$3 each. Carlson, W0KYR, New London, Iowa.

**CRYSTALS:** acid etched, BT cut. Frequencies 4100 to 9000 Kc. minimum activity, 4 milliamperes. Mounted in octal (PT243) or 5 pin holders (1/4" pins spacing). Your frequency with 10 Kc. \$1.00; 5 Kc. \$1.25. Calibrated within 1 Kc of marked frequency. Exact frequency, \$1.75. Holders, 20c. AT-BT Xtd, Box 41, Park Ridge, Ill.

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**INSTRUCTOGRAPH, 110 AC,** practically new, 17 tapes. TAC oscillator, \$25. Walter C. Ross, 36 Harkness Ave., Springfield, Mass.

**FOR Sale:** Meissner 150-B transmitter complete with operating spares and extra set 10 meter coils and conversion plans, \$250. You pay freight. Mrs. W. B. Dobbs, 45 Melrose St., Arlington, Mass.

**SP400X Comet Super Pro.** Tuning range 560 Kcs to 30 Kcs. New production, not war surplus. Complete with LS and pwr supply. \$225.00. Paddon, c-o ARRL Hq.

**SELLING out:** Trillett Models 1200, 1210-A, 1220-A complete with carrying case, \$35. Riders manuals, Vols. 1 and 4, \$5 each. W8AUH.

**NATIONAL 3" scope,** perfect, \$22. New set Millen wavemeters in case, \$15; perfect Masco P.A. system in leather carrying case, 2 spkrs, MAS-17-P, \$40; latest Meissner Port. radio-recorder, P.A. spkrs for \$175 net. Brand new First \$125 takes it. W2E2C, 512 Ferndale Drive, Binghamton, N. Y.

**FB 50-watt Cw 25 fone,** 807 triode, 807 final. 6N7 Class B mod. 80, 40, 20, 10. Supply, mike, key, tubes: all coils and xtals. \$60.00 Money-back guaranteed perfect. Philco tube-tester with modernizer \$12.50. J. Beavers, Kosciusko, Miss.

**HRO for sale:** grey rack model with pwr supply and 1.7-30 Mc coils. Perfect. \$195, or best offer. Dick Wheaton, 220 Main St., Hobart, Ind.

**WANTED:** HRO, jr. coils for 80 and 40 and bandsread coils for 10 meters. E. M. Roberts, Box 491, Carrizozo, New Mex.

**FOR Sale:** NTE National exciter unit, 10 watts RF and 10 watts audio 80, 40, 20, and 10. Best offer takes it. I. Werlin, 114 Essex St., Malden, Mass.

**FOR Sale:** 2-meters complete outfit, including 1 R-4 mike, 110 V.A.C 6 V.D.C. pwr supp. and coaxial antenna. Best offer. Also a few Hammarlund variables, No. HFD-140 at \$1 ea. (nest cost \$2.50). Robert Chapin, 39 Poplar St., Melrose, Mass.

**WANTED:** One or more 12 volt pwr supply, No. 211035 for T.C.S. No. 6 or No. 9. Sackermann, 649 34th St., Union City, N. J.

**800 Watt xmt:** 80, 20, 10 fone. PP V-200 final. 82" enclosed Par-Metal rack. Best cash offer. All inquiries ansd. Local sale preferred. W2OTV, 522 Moselle St., Buffalo 15, N. Y.

**SELL:** UTC SX80 CW transmitter complete, gray crackle cabinet 40-80 coils. Best offer. W2LSE, 222 Wickham Ave., Middletown, N. Y.

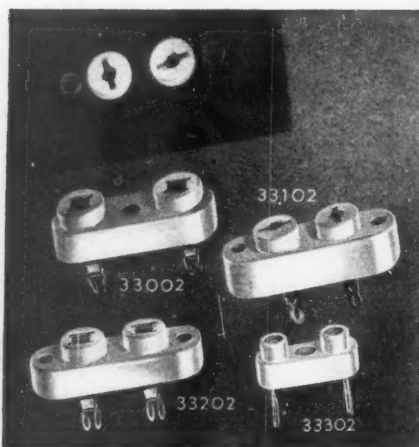
**SELLING out:** send for list. W9RSR.

**TR-4 Abbott transmitter-receiver** complete with all tubes, less pwr supply converted for 2-meters, \$30. C. Hodges, jr., 11 West Chase St., Baltimore, Md.

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## Crystal Holder Sockets 33002, 33102, and 33202 Plus new 33302 for CR7

In addition to the original 33002, 33102 and 33202 exclusive Millen "Designed for Application" steatite crystal holder sockets, there is now also available the new 33302 for the new CR7 holder. Essential data:

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33102.....	.095	.500
33202.....	.125	.500
33302.....	.050	.500

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MASSACHUSETTS



## Index to Advertisers

Allied Radio Co.	111
American Lava Corp.	77
American Phenolic Corp.	104
American Radio Institute.	143
Arrow Electronics, Inc.	133
Ashe Radio Co., Walter.	123
Assembly Products, Inc.	134
Astatic Corp., The.	7
Barker & Williams.	145
Boland & Boyce.	118
Browning Laboratories.	86
Burgess Battery Co.	82
Burlington Instrument Co.	142
Burstein-Applebee Co.	190
Candler System Company.	149
Capitol Radio Engineering Institute.	85, 150
Chicago Industrial Instrument Co.	146
Clark Crystal Company.	144
Cleveland Institute of Radio Electronics.	92
Clippard Instrument Lab, Inc.	139
Collins Radio Company.	156
Commercial Radio Institute.	149
Condenser Products Co.	103
Continental Sales Co.	146
Delehanty Institute.	130
DeMambo Radio Supply Co.	127
Drake Electric Works.	140
Eitel-McCullough, Inc.	75
Electro-Mechanical Mfg. Co.	113
Electro Voice.	73
Electronic Indicator Corp.	145
Electronic Marketers, Inc.	110
Electronic Navigation.	138
Gables Engineering Incorp.	130
Gardiner & Co.	143
General Electric Co.	1
Gon-Set Company.	144
Hallcrafters Co., The.	4, 5
Hammarlund Mfg. Co., Inc., The.	9
Harrison Radio Co.	121
Harvey Radio Co.	116, 117
Harvey-Wells Electronics.	100
Heintz & Kaufman, Ltd.	105
Henry Radio Stores.	115
Hytron Radio & Electronics Co.	95
Instructograph Co., The.	145
International Resistance.	106
Jensen Mfg. Company.	93
Johnson Co., E. F.	88, 126
Johnson Sales Co., Art A.	150
Jones Electronics, M. C.	147
Kato Engineering Co.	145
Ken-Rad.	101
Knights Co., James.	124
Leeds Radio Co.	125
Maguire Industries.	109
Mallory & Co., P. R.	80
Mass. Radio & Telegraph School, Inc.	126
Melville Radio Institute.	149
M & H Sporting Goods Co.	108
Millen Mfg. Co., Inc., Jas.	154
Munger Co., Rex L.	84
National Co., Inc.	71, 83, Cov. III
Newark Electric Co.	96, 97
N. Y. YMCA Tr. & Tech. Schools.	147
Ohmite Mfg. Co.	8
Onan & Sons, D. W.	146
Par-Metal Products Co.	128
Peerless Radio Distributors.	114
Petersen Radio Co.	99
P & H Sales Co.	149
Port Arthur College.	150
Pre-Max Products Co.	149
RCA Institutes, Inc.	145
Radio Corp. of America.	Cov. IV
Radio Electric Serv. Co. of Penna.	133
Radio Manufacturing Engineers.	147
Radio Parts Distributing Co.	122
Radio Products Sales Co.	89, 90, 91
Radio Shack Corporation.	148
Radio Transceiver Labs.	148
Richardson Labs, Kenneth.	148
Shure Brothers.	102
Signal Electric Mfg. Co.	143
Silver Co., McMurdo.	94
Simpson Electric Co.	141
Sonar Radio Co.	155
Speedway Mfg. Co.	134
Sprague Products Co.	81
Standard Radio Elec. Products Co.	142
Standard Transformer Corp.	132
Steinberg's.	139
Sun Radio & Electronics Co.	137, 148
Sun Radio of Washington.	119
Sylvania Electric Prod. Co.	87
Terminal Radio Corporation.	131
Turner Co., The.	147
UHF Resonator Co.	143
Ungar Electric Tools Co.	147
United Electronics.	107
United Transformer Corp.	Cov. II
Universal Radio Supply Co.	150
Valparaiso Technical Institute.	143
Vibronex Co., The.	128
Ward Leonard Electric Co.	98
Webster-Chicago Corp.	79
Weems System of Navigation.	138
Workshop Associates.	141
World Radio Laboratories.	112

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# HAM-ADS

(1) Advertising shall pertain to radio and shall be of nature of interest to radio amateurs or experimenters in their pursuit of the art.

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(7) Because error is more easily avoided, it is requested signature and address be printed plainly.

(8) No advertiser may use more than 75 words in any one issue.

Having made no investigation of the advertisers in the classified columns, the publishers of QST are unable to touch for their integrity or for the grade or character of the products or services advertised.

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**METER repair.** Braden Engineering, 3317 Kenmore, Dayton, O.

**COMMERCIAL** radio operators examination, question-and-answers. One dollar per element. G. C. Waller, WSATV, 6540 E. Washington Blvd., Tulsa 15, Okla.

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**W3JJ** now W3JJ. John Knight, 2230 Cathedral Ave., NW, Washington 8, DC.

**CUSTOM** building of ham equipment, your specifications. Medium power xmitters, VFOs, etc. Inquire Chatel, W2RSC, ex-W1DIF, 235 Duffield St., Brooklyn, N. Y.

**QSLs in plastic** — record cards, Ham Xmas cards. Stamp for samples. Reber Print, R.D. 1, Sewell, N. J.

**CRYSTALS:** Precision low drift units. Type 100A in 80, 40, and 20 meter bands. Two units plug in one octal socket. Plus or minus 5 Kc. One dollar each. Exact frequency, \$1.95 ea. Rex Bassett, Inc., Ft. Lauderdale, Fla.

**BEAM** Control Cable 2 #16; 6 #20 conductors, weatherproof, shielded. 10¢ ft. Associated Industries, 6639 S. Aberdeen St., Chicago, Ill.

**AAK** now stateside has QSL'd 100% direct or through bureaus. Will gladly send duplicate when requested. W5KDA Box 987 Wink, Texas.

**QSL's, Samples,** Albertson, W4HUD, P.O. Box 322, High Point, N. C.

**QSL's-Kromekote Cards,** Dauphine, W1KMP, Box 219, Cambridge A, Mass.

**LELAND** 2500-watt 115 volt 60 cycle self excited alternating current generator for sale or trade. Ideal unit for emergency power, summer camp, etc. W0BOH-Box 931 — Lincoln, Nebraska.

**WILL** sell or swap my ham gear for RME-69 receiver. Send for list W7CNA, Prineville, Oregon.

**HQ 129-X,** \$140; Millen exciter, coils 20,80, \$35.; 700V power supply, \$35.; wired pp 813 amplifier, two meters, \$25; Bud VLS coils 80,20, \$2.00 each; new 813's, \$3. each; T. J. Riley, jr., W3MBW, 123 South 3rd St., Lewisburg, Pa.

**TRANSMITTER** kits, 40 watts, \$69.50. Exciter kit, \$17.95, 275 watt Globe King. All makes and models new and reconditioned receivers. Trade ins accepted; low payment plan; terms financing by Leo, W0GPF. Write for specials. World Radio Labs., Council Bluffs, Iowa.

**WANTED:** top and cabinet for R. F. Section for BC610 or HT-4 transmitter; also BC610 tuning units. Gordon J. Nordstrom, W0ICQ, 1520-5th St., N. W. Cedar Rapids, Iowa.

**WANTED:** F. M. Exciter. Make a trade. Cates, 1304 Vineville, Macon, Ga.

**QSLs, SWLS.** Quick service. Samples for stamp. McQuade, W8WRI, 1071 E. Fulton Columbus 5, Ohio.

**SELL:** Hickok model 34JR tester. Good condition. First reasonable offer takes. W9OFU, Taylorville, Illinois.

**TRANSFORMERS-Modulation, Plate, Driver, Chokes, Bias, Clipper Chokes** all sizes. Also rewinding, cat catalogue. Frampton Transformer Shop, Box 109 Blackwell, Okla., W5HXC.

**SELL:** Excellent S40 Hallicrafters with "S" meter—\$85; want SX25. Walter Camp, jr. 236 Emerson St., Wash. 11, D. C.

**SELL:** used SX-28 in original metal cabinet. Also NC-200 with matching speaker. Both in good condition. \$150. each. R. F. Wolf-skill, 7944 Jarboe St., Kansas City, Mo.

**SELL:** Hallicrafters S-39 portable. Good condition. \$75. Dick Wexler, 157 W. 80th, New York, N. Y.

**SELL:** Meck T60-1 60 watt xmt. Excellent condition. Best offer takes it. W1PYE, 19 Fotosi St., Dorchester 22, Mass.

**SELL:** RME-45, perfect, improved noise limiter, speaker, \$160. 12 tube Howard model 450 comm. rcvr., good working condition, speaker, \$50. Trade for good lab test equip. H. Sayers, W9NZS, 6804 Northwest Hwy., Chicago, Ill.

**WANTED:** Thordarson Driver Transformer T-15D84, W4DJZ.

**KILLOWATT** final and modulator tubes! First \$30.00 buys pair used 833's and new 810's. Express extra. W9QXT, Pleasant Hill Missouri.

**QSLs** Quality cards, priced right, samples. Ferris, W9UTL, RR-3, Box 560, Indianapolis, Ind.

**KENTUCKY Values!** 826's, 50W HF triode—\$1.00; 829B's—\$4.95; Socket for either above—\$.59; New TU-5-B8a, case—\$275; Jan. 708's, 866's, many other items, tremendous bargains. Write for circular and save money. Kentucky Radio Supply Co., Lexington, Kentucky.

**IN STOCK:** New and used Hallicrafters, National, Hammarlund Collins, Millen, RME, Sonar, Meissner, Temco, Meck, Pierson other receivers, transmitters, parts, etc. Lowest prices. World's Best terms. Reconditioned S38 \$35.00, S20R \$49.00, S40 \$59.00, RME84 \$69.00, RME45 \$99.00, ARRT \$89.00, DB20 \$29.00, Meck T60 \$99.00, NC240D \$169.00, HQ129X \$99.00, SPC 400SX \$199.00, SPC400X \$249.00, KP81 \$249.00, S22R, SX25, SX16, SX28A, SX42, HQ129X, NC173, HRO, HT9, Temco 75GA, and other receivers and transmitters. Shipped on approval. Write. Henry Radio, Butler, Mo.

**QSLs, SWLS, Ham Xmas** cards, Stationery, etc. Beautiful stock. Write W9BHV QSL factory, 857 Burlington, Frankfort, Indiana.

**SELLING** out entire station W5KVM. Hallicrafters HT-9 transmitter, National 173 receiver, latest model Meissner VFO, many extras. All equipment purchased brand new this year. Preference given wholesale. Julius Bamberg Box 779, Galveston, Texas.

**FOR Sale:** BC-348-Q converted to a.c. crystal phasing control added, \$69.50. W8PUF 419 Front, Adrian, Michigan.

**TRANSMITTER** — new Collins ART-13 Autotune for sale. Also — Hallicrafter S-20R, Gardiner sender. John Bradley, Montclair, New Jersey.

**WANTED:** QST: Jan. through June, Aug., Oct. 1940; June 1942. Good condition only. Bend, 54 S. Cretin, St. Paul, Minn.

**SELL or Swap:** Sprague tel-ohmike model 16 RCA volt ohmyast, sky champion S20R, HQ 129X, panoramic panadaptor, plate transformer 1000, 1500, 2000, each side, 212Ds 852, 211 with sockets and filament transformers, 2 1/2 super het. Instructograph with tapes. W2LV, Argyle, New York.

**SELL:** Maris II with accessories Dynamotor supply unassembled \$34. Stancor xmt 811 final, Complete \$100., Box 117 Cape Girardeau, Missouri.

**SELL:** RME-69, factory noise suppressor and DB-20 good working order and appearance, 12" P. M. speaker in baite. Best offer over \$125 takes all C. O. D. express collect. W. E. Neff, jr., W1AH Cheshire, Conn.

**MEISSNER** 150-B xmt complete, not modified, \$225.00 F. O. B. Write W1OHJ, 38 Richdale Ave., Somerville 43, Mass.

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**SELL:** NC-200, HRO, FB7, Millen VFO, Exciter, Biley Vari-X KW final 810's B & W coils cond., "B" & "C" supplies, misc tube and coils. W3QP, Blue Bell, Pa.

**WANTED:** National "NSM" Modulator. Thrope, W8JDG, 698 St. Clair Ave., Detroit 14, Michigan.

1,000 unused, new, government surplus tuning condensers by Card well: Dual 27 mmf/sec 70 mil airgap \$1.15 two for \$2.00; 35 mmf/sec 30 mil airgap \$1.05 two for \$1.80; Single section 150 mmf 80 mil air gap \$1.35 two for \$2.35; 300 mmf 30 mil airgap 60 cents two for \$1.10. Six other types. Other surplus items. Hieronymus Radio, 100-35 201st St., Hollis 7, N. Y.

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**SELL** — 20 watt VFO 80&40 output, separate power supply \$35.00; F1 Mike & stand \$2.00; Thordarson T70 or 78 transformer \$3.00, W1 NKW 76 Fox Hill Road, Nahant, Mass.

**FOR Sale.** 600 Watt C. W. Transmitter P. P. 813's in final, Millen exciter. Coils for 10,20,40,80. 6 ft. open rack. Complete with power supplies. Well built. No junk. W2PFO, 12 North Ferry Street, Schenectady, New York.

**CRYSTAL Kit:** — Includes 4 low drift, highly active crystals, 2 holders, abrasive, instructions, treatise. State band preferences from 3500 to 8500 kilocycles. \$1.00 complete, Breon Laboratories, Williamsport, Penna.

**QST** — New HRO — Drawn at hamfest. Complete. 4 sets coils, apk and power supply. First bid over \$200.00 takes it. W0AMJ Willard Sauvago, Coon Rapids, Iowa.

FOR Sale: Wire recorder, brush Navy type complete with one hour magazine with erase and playback head, amplifier with dynamic, crystal or carbon mike input; and reversing drive motor — \$50.00 W8MVZ.

BEAM Rotators — Propeller mechanisms 24V AC or DC — \$10.50 WIGOS-K, F. D. 3, Bridgeport, Conn.

TWO HK-257-B Gammatrons Never used, and in original factory package. Sell for \$15, each or trade for their original value of \$25, each. H. E. Moore, 13 So. Dubuque St., Iowa City, Iowa, W0TWR.

XUIYR will reply to all QSLs. Address W2JCT, 405 Berkley Ave., Bloomfield, N. J.

FOR Sale: RME-45 and matching speaker. Used very little. First \$100.00 takes it. Thomas N. Jones, 334 Wildwood Dr., East Lansing, Michigan.

PREWAR HRO 1.7-30 Mc. Bandspread coils in good condition with pwr supply and speaker \$145.00. W8MSG, Cleveland, Ohio.

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ROTARY converter 110 VDG to 110 VAC 60 cycles @ 225 W. Best offer over \$30 or trade. W9PTW 514 S, Victor, Tulsa, Oklahoma.

WANTED: Will pay top price for P E 237. Unit is vibrator power supply for the S C R 694. Will be extremely grateful for card from any ham with information where I can obtain. Gordon Klemgard, Pullman, Wash.

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TRADE: Sonar FM exciter with 40 meter link tuning unit, including 3 xtals, for Gonset 10 meter converter. M. W. Hans (PE6-1485) 35-36 76 St. Jackson Heights, N. Y.

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FOR Sale — Hickok model 4957, volt ohm milliammeter; used very little, \$29.85 postpaid. George Land, 34 Chelton Rd., Havertown, Pa.

SALE or swap — National 1-10 recvr with coils, power supply, excellent condition as used only for test purposes. Will swap for 10 mtr Gonset convtr or \$40. W2SHE, 111-25, 77 Ave., Forest Hill, N. Y.

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QSLs, maps of all states, all provinces of Canada, all countries. QSL Printer, Box 974, Ft. Wayne, Indiana.

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QSTs — 151 issues since 1930 — List on request. \$30 or typewriter or what? W9CFC, S. F. Bushman, 1411 N. Central Ave., Chicago 51, Illinois.

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W6EBT is former W1EBT and V02X. QTH: 3434 Palm St., San Diego, Calif.

SELL: 67 odd copies QST, 1927-1935. W0DD, Estes Park, Colo.

SELL: RME-69 rcvr, \$65. Abbott TR4B with tubes, \$40. W2EXB Garden Road, Vineland, N. J.

TRANSFORMER: Thordarson 1000-1500 Volts, 450 watts. Best offer. A. Lukach, 292 Madison Ave., N. Y. C.

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MECK 760-1 xmt, like new, cost \$150. Will sell \$120. W3KW7/3 Linden Ave., Troy, N. Y.

CHASSES: Aluminum, custom-built or stock sizes. 17" x 13-3/4". \$2.50. Other sizes priced proportionately. Write for quotations, folder, John Helm, 713 West 3rd St., Williamsport, Penna.

NC-101X with spkr, like new. All Hambands. Best offer takes Fred Singer, APL-JHU, Silver Spring, Md.

FOR Sale: National HRO with all coils, pwr supp. and spkr and calibrated S-meter, \$175. National 240-C complete \$150. W8BCA.

FOR Sale: Millen 50-watt xmt, exciter with coils and tubes, \$35. Millen variator for 80-40 meters, \$55. Thordarson bandswitching 100-watt xmt. Kit complete with coils and tubes T240, 61A, 8, 866 jrs. \$75; RME-45 Calomatic dial, etc. \$150. All guaranteed perfect. R. B. Cooper, W8AQA, 132 Guild, Grand Rapids, Mich.

SELL complete Meissner 150 B, very reasonable. W2NQW, 46 Seward, Port Jervis, N. Y.

FOR Sale: Stancor 60-P, 60-watt fone, c.w. xmt. in Deluxe cabinet, coils for 80 and 40. \$80. Zink, W2OSM, 1246 St. Lawrence Ave. New York 60, N. Y.

SELL: SX-28 with spkr, \$135. National NTX-30 xmt, \$65. Also 10 mobile rig. E. Harris, 3319 Catalpa, Chicago, Ill.

BRUSH model BK-401, magnetic ribbon recorder & playback. Used about 10 hours. Cost \$229.50. Will sell for \$180.00. Blum, 2660 Dibble Ave., Columbus 4, Ohio.

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SELL: 2 SCR522 transmitters and receivers converted for 2 meters. Latest model and brand new prior to conversion. A-1 condition and commercial appearance. Includes such extras as panel mounting, S-meters, crystal controlled BFO, National Vernier dial, voltage regulation and one has additional stage of preselection. Price \$175, each, trans. complete. Write for information. F. O. B. Erie W3NOJ, 1824 West 32nd Street, Erie, Penna.

HRO receiver, model STA-1, brand new, including power supply, speaker and 1.7-30 mc. coils, \$215. W3HBE, 1008 Rodman Road, Anby Park, Wilmington 187, Delaware.

WANTED: technical Instruction Book, also Shock Mounting Aluminum Base for an LM-10, LM-14 (or similar series) Navy type frequency meter. Your price — write Harry Lord, 2621 Oak Road, Tucson, Arizona.

SELL: Millen exciter, excellent condition, 40, 20, 10 meter coils. Richard Burson, W8TMQ, 11414 Woodmont, Detroit 27, Mich.

BC348R, noise limiter, S-meter. Includes AC pack, speaker, broadcast converter, 10 meter broadband converter exactly as in Ham book. Best offer over \$75.00. Steven W. Kocik, 3633 E. 114 St. Cleveland 5, Ohio.

BUY of the year: New BC-610 minus cabinet, meters. \$185.00. Write W9HUN, 4146 No. Pittsburg, Chicago, Illinois.

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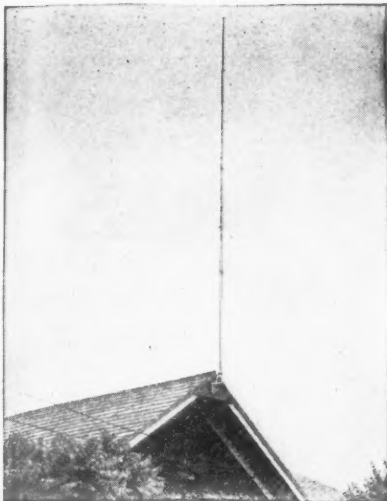
SELL: My calomatic RME-45 with matching speaker. Absolutely A-1 in appearance and operating condition. Will ship in original cartons with instruction book F. O. B. My QRA. Price \$150. W2SGK Gerald B. Wright, 28 West Orchard St., Hempstead, L. I., N. Y.

2 Meter equipment; receivers, tuners, low power transmitter; write free catalog; Constant Electric, 112 Cornelia St., Brooklyn 21, N. Y.

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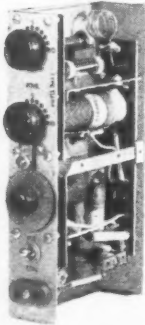
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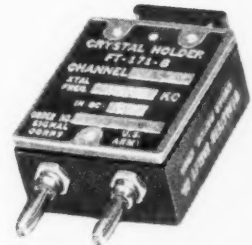
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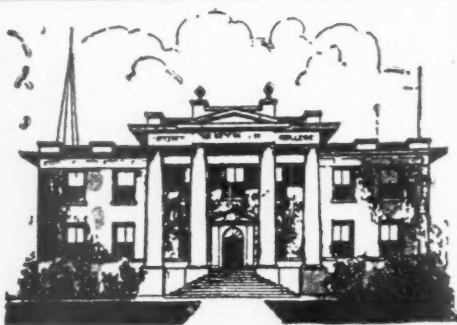
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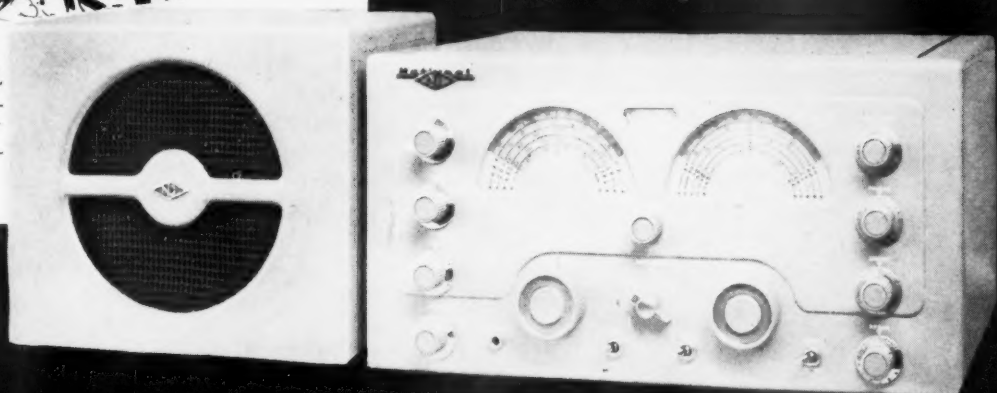
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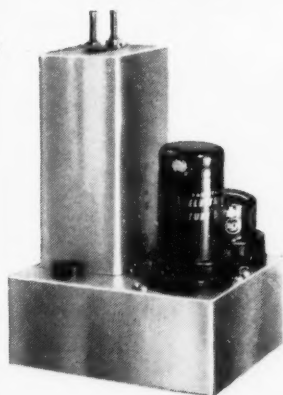
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The NFM-83 employs the new ratio detector for maximum noise suppression and high sensitivity.

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The NC-183, latest in National's great new line of communications receivers, is a band-switching set covering frequencies from 0.54 to 31 MC plus the 6 meter band. Two r.f. amplifier stages provide remarkable image rejection and the latest crystal filter aids in maintaining the highest degree of selectivity.

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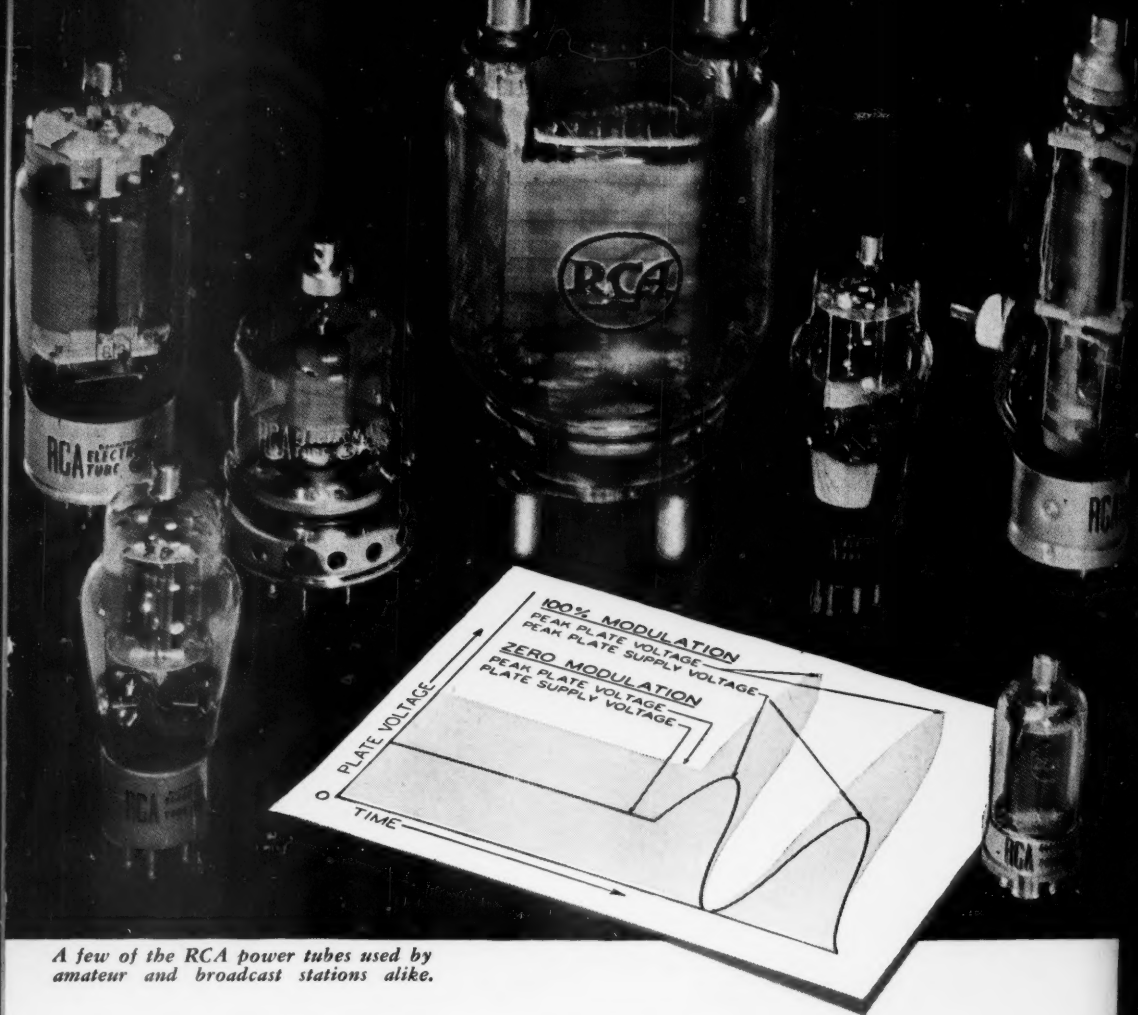
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RCA power tubes have the *extra* safety factor required for the most rigorous service . . . ample reserve of cathode emission to satisfy modulation

peaks . . . husky grid structures that permit amp drive without causing grid emission . . . high voltage insulation.

High safety factor is one of the reasons why broadcast stations, for example, use *more RCA power tubes than any other make*. To get all the tube power, performance and life *you pay for* . . . buy RCA tubes. Your local RCA Tube Distributor has them in stock.

The Fountainhead of Modern Tube Development is RCA



**TUBE DEPARTMENT**

**RADIO CORPORATION of AMERICA**  
HARRISON, N. J.



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